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## 5.0 REFERENCES

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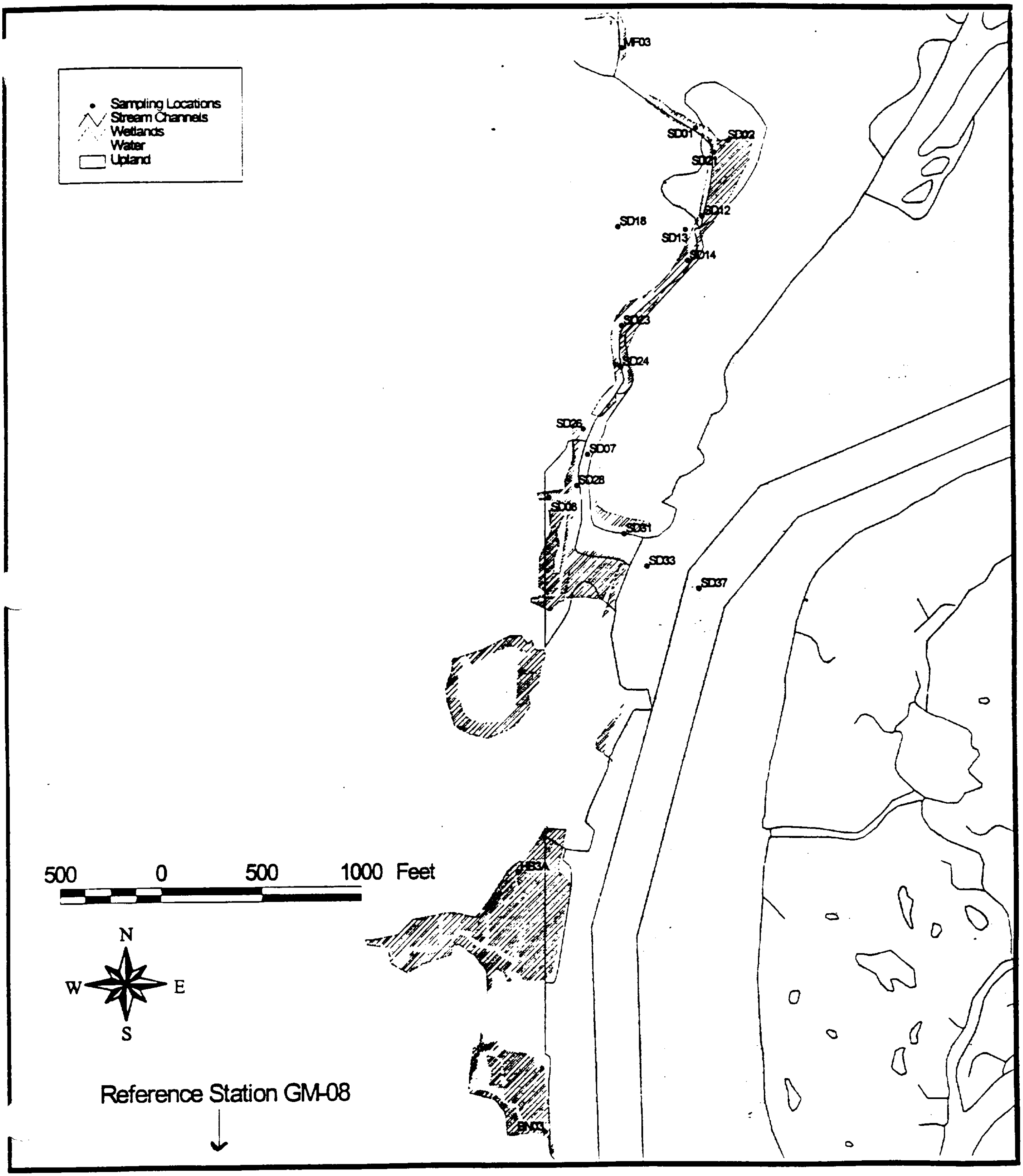
Figure 2-1.1. PRG Sampling Locations in the vicinity of the Raymark Facility Superfund Site in Stratford, CT: All Stations

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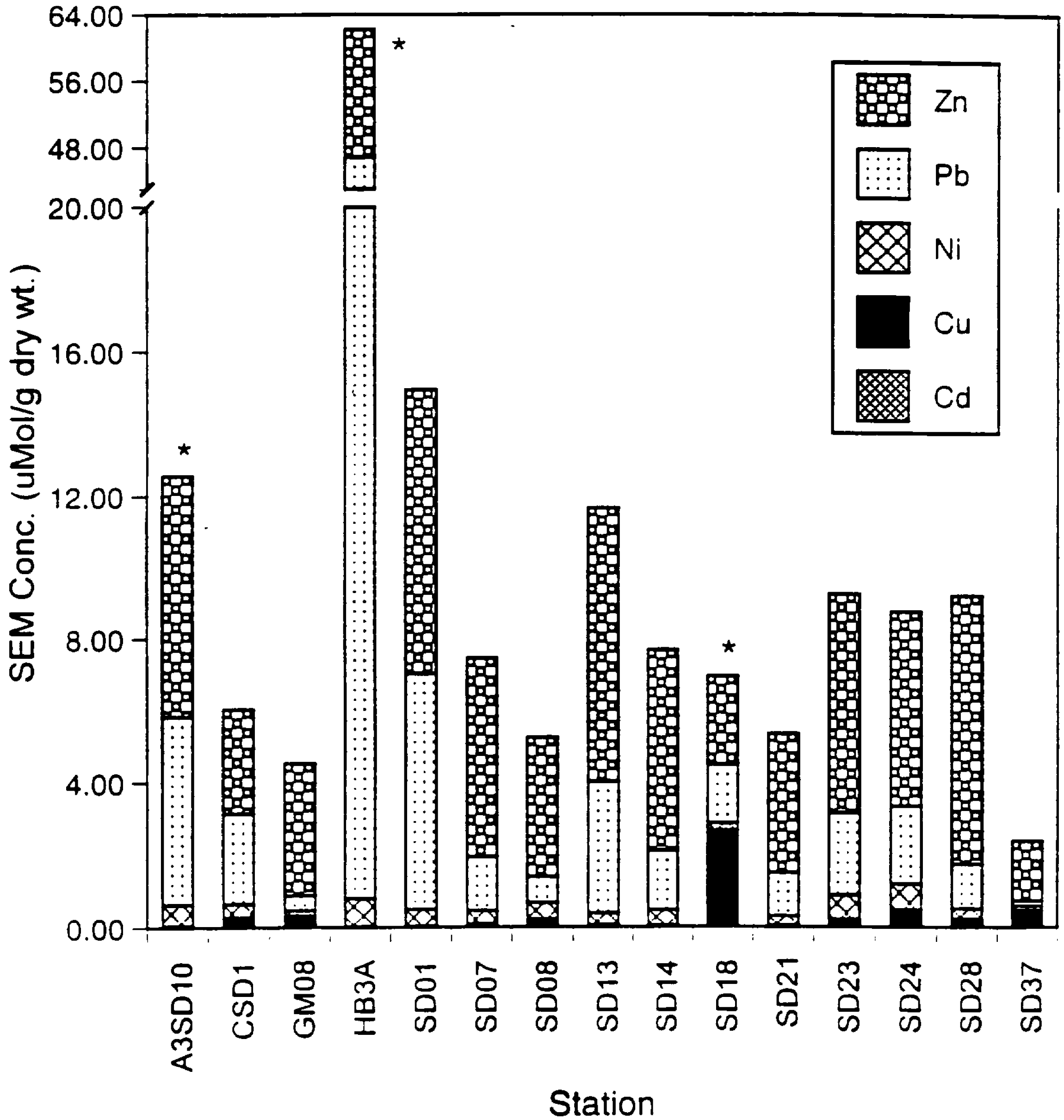



Figure 3.2-1. SEM concentrations (μMol/g dry) of divalent metals in whole sediments collected from Raymark study area. Asterisk indicate SEM-AVS > 0, hence the potential for metal-related toxicity to infauna.

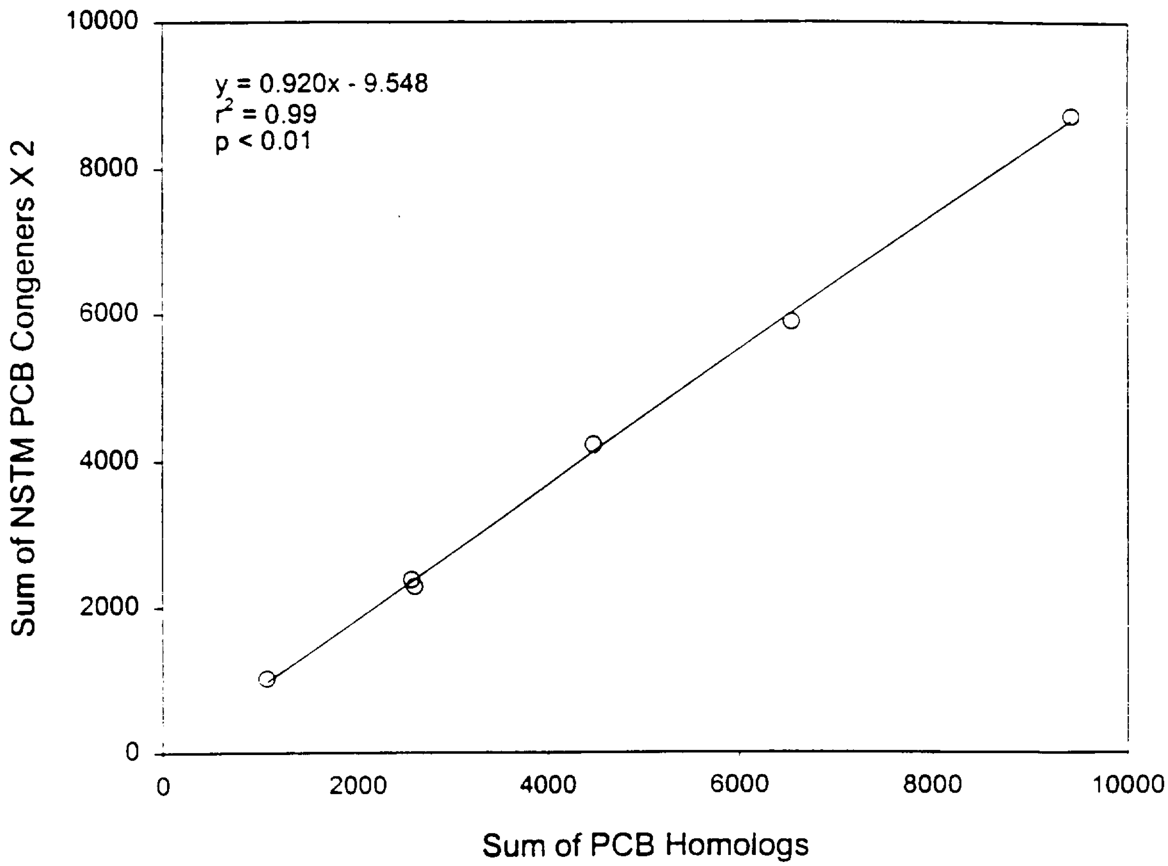
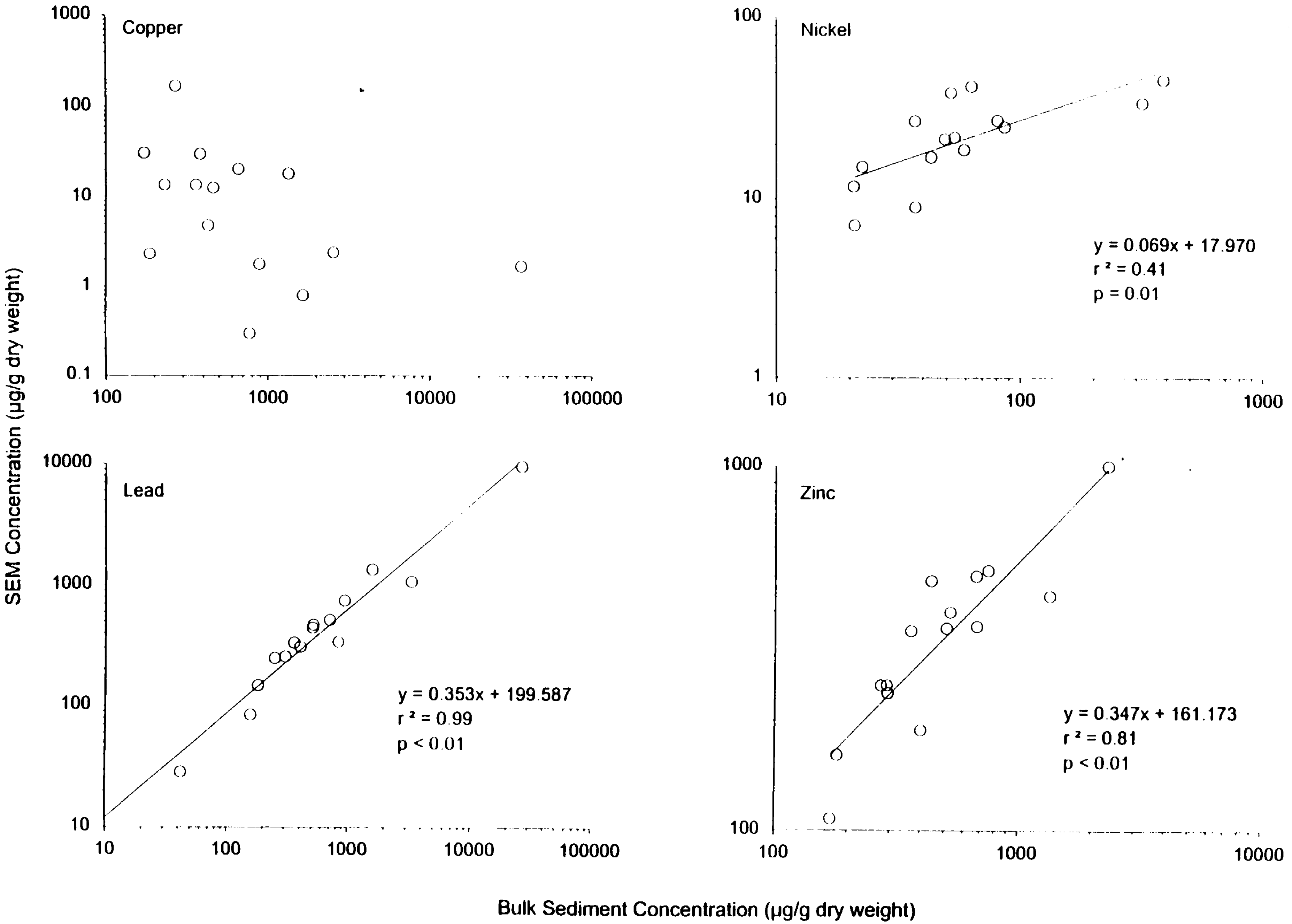



Figure 3.2-2. Relationship between congener-based and homolog-based estimates of Total PCB concentrations in sediments collected from the Raymark study area.




.gure 3.4-1. SEM concentration versus bulk sedimen .centration for samples collected for the Raymark stu ea.

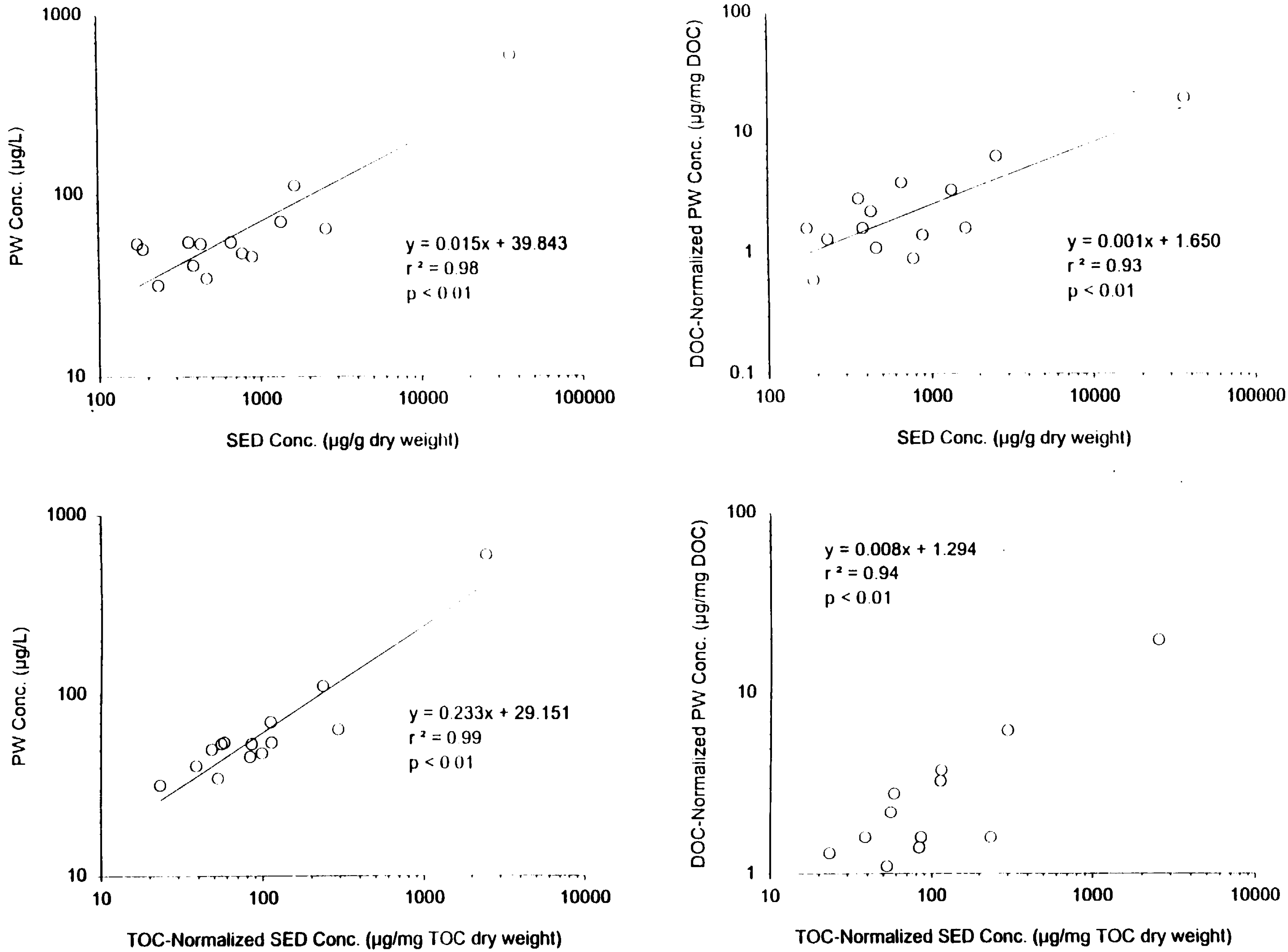



**Figure 3.4-2. Whole and DOC-normalized porewater (PW) concentrations versus whole and TOC-normalized sediment (SED)**

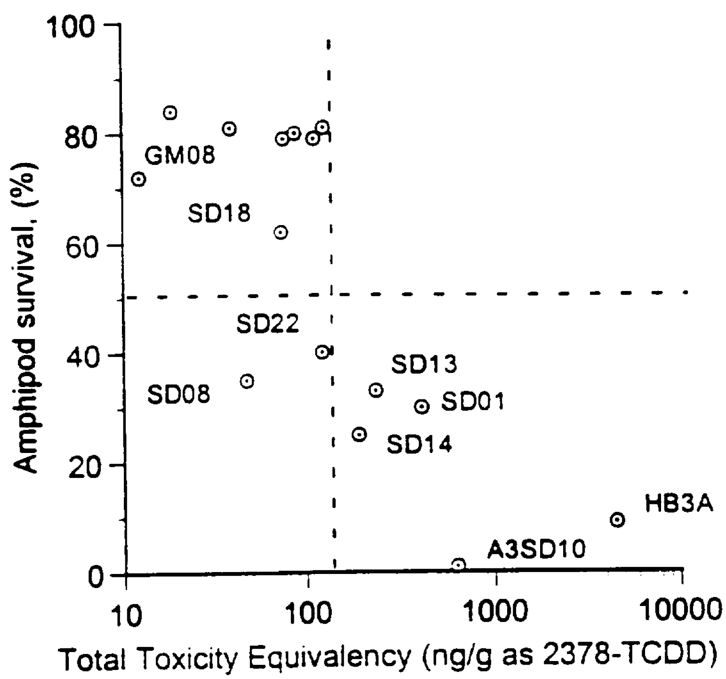



Figure 3.4-3. Exposure - response relationship between amphipod survival and dioxin toxicity relative to 2378-TCDD.

Table 3.1-1. Results of *Ampelisca abdita* survival tests with bulk sediments collected from the Raymark study area.

| Station | Ammonia (mg/L)[1] | | Survival Bulk Sediment | |
|---|---|---|---|---|
| | Total | Unionized | % Control[2] | Flag[3] |
| A3SD10 | 2.05 | 0.01 | 1.00 | +++ |
| CSD1 | 8.92 | 0.06 | 81.0 | - |
| GM08 | 2.04 | 0.01 | 72.0 | + |
| HB3A | 6.43 | 0.11 | 9.00 | +++ |
| SD01 | 6.59 | 0.10 | 30.0 | ++ |
| SD07 | 26.1 | 0.38 | 79.0 | + |
| SD08 | 23.8 | 0.20 | 81.0 | - |
| SD13 | 18.3 | 0.27 | 33.0 | ++ |
| SD14 | 13.4 | 0.16 | 25.0 | ++ |
| SD18 | 7.12 | 0.02 | 62.0 | + |
| SD21 | 8.43 | 0.08 | 35.0 | ++ |
| SD23 | 6.69 | 0.08 | 40.0 | ++ |
| SD24 | 3.65 | 0.05 | 80.0 | - |
| SD28 | 15.6 | 0.43 | 79.0 | + |
| SD37 | 8.51 | 0.11 | 84.0 | - |
| BN03[4] | 6.67 | 0.09 | 87.0 | - |
| MF03[4] | 17.8 | 0.21 | 97.0 | - |
| SD26[4] | 8.24 | 0.12 | 100 | - |
| SD31[4] | 11.8 | 0.16 | 95.0 | - |
| SD33[4] | 4.47 | 0.10 | 86.0 | - |

1 - Ammonia measurements from overlying water column.

2 - Survival in Long Island Sound sediment used as control response for all treatments.

3 - Rankings for impacts to *Ampelisca* survival:
High (+++) <20 %; Intermediate (++) ≥20 and <50%; Low (+) ≥50 and <80%;
Non-toxic (-) >80%.

4 - Stations with > 85% survival not selected for further TIE analysis.

Table 3.1-2. Results of *Ampelisca abdita* survival tests with sediment porewaters collected from the Raymark study area.

| | Whole Porewater Ammonia (mg/L) | | Survival[1] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Whole Porewater | | EDTA-Treated Porewater | | C18-Treated Porewater | |
| Station | Total | Unionized | LC20[2] (%) | Flag[3] | LC20[2] (%) | Flag[3] | LC20[2] (%) | Flag[3] |
| A3SD10 | 19.6 | 0.12 | 77.3 | + | 100 | - | 100 | - |
| CSD1 | 16.5 | 0.33 | 64.3 | + | 70.0 | + | 83.3 | - |
| GM08 | 12.3 | 0.06 | 80.0 | - | 100 | - | 100 | - |
| HB3A | 16.0 | 0.13 | 66.7 | + | 60.0 | + | 22.7 | ++ |
| SD01 | 34.3 | 0.30 | 40.0 | ++ | 60.0 | + | 55.6 | + |
| SD07 | 31.4 | 0.64 | 60.0 | + | 62.5 | + | 83.3 | - |
| SD08 | 29.3 | 0.36 | 43.5 | ++ | 60.0 | + | 60.0 | + |
| SD13 | 37.0 | 0.41 | 60.0 | + | 60.0 | + | 60.0 | + |
| SD14 | 27.4 | 0.27 | 60.0 | + | 55.6 | + | 60.0 | + |
| SD18 | 44.1 | 0.09 | 25.0 | ++ | 18.0 | +++ | 18.0 | +++ |
| SD21 | 35.6 | 0.28 | 60.7 | + | 60.0 | + | 60.0 | + |
| SD23 | 23.5 | 0.51 | 60.0 | + | 60.0 | + | 60.0 | + |
| SD24 | 23.3 | 0.37 | 51.7 | + | 61.1 | + | 60.0 | + |
| SD28 | 23.0 | 0.51 | 100 | - | 100 | - | 100 | - |
| SD37 | 49.6 | 0.80 | 28.1 | ++ | 57.9 | + | 55.0 | + |

Shaded values indicate ≥ 10% change from whole porewater response.

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Lethal Concentration - 20% (concentration of porewater causing 20% reduction in survival).

3 - Rankings for impacts to *Ampelisca* survival:

High (+++) <20 %; Intermediate (++) ≥20 and <50%; Low (+) ≥50 and <80%; Non-toxic (-) >80%.

Table 3.1-3. Results of *Ampelisca abdita* survival tests with aerated and non-aerated sediment porewaters collected from the Raymark study area.

| | Survival | | | |
|---|---|---|---|---|
| | Non-Aerated Porewater | | Aerated Porewater | |
| Station | % Control[2] | Flag[3] | % Control[2] | Flag[3] |
| A3SD10 | 100 | - | 100 | - |
| CSD1 | 100 | - | 100 | - |
| GM08 | 100 | - | 100 | - |
| HB3A | 0.00 | +++ | 0.00 | +++ |
| SD01 | 0.00 | +++ | 0.00 | +++ |
| SD07 | 90.0 | - | 0.00 | +++ |
| SD08 | 80.0 | - | 80.0 | - |
| SD13 | 30.0 | ++ | 10.0 | +++ |
| SD14 | 10.0 | +++ | 0.00 | +++ |
| SD18 | 0.00 | +++ | 0.00 | +++ |
| SD21 | 20.0 | ++ | 10.0 | +++ |
| SD23 | 0.00 | +++ | 0.00 | +++ |
| SD24 | 80.0 | - | 0.00 | +++ |
| SD28 | 80.0 | - | 100.0 | - |
| SD37 | 40.0 | ++ | 0.00 | +++ |

Shaded values indicate ≥ 10% change from non-aerated porewater response.

1 - Ammonia measurements from overlying water column.

2 - Survival in Long Island Sound sediment used as control response for all treatments.

3 - Rankings for impacts to *Ampelisca* survival:

High (+++) <20 %; Intermediate (++) ≥20 and <50%; Low (+) ≥50 and <80%;
Non-toxic (-) >80%.

Table 3.1-4. Results of *Mulinia* la: development test. : sediment porewater :llected from the Raymark study area.

| Station | Whole Porewater Ammonia (mg/L) | | Normal Larval Development[1] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Whole Porewater | | EDTA-Treated Porewater | | C18-Treated Porewater | |
| | Total | Unionized | EC20[2] (%) | Flag[3] | EC20[2] (%) | Flag[3] | EC20[2] (%) | Flag[3] |
| A3SD10 | 19.6 | 0.12 | 0.41 | +++ | 17.0 | ++ | 2.05 | +++ |
| CSD1 | 16.5 | 0.33 | 11.7 | ++ | 11.2 | ++ | 2.46 | +++ |
| GM08 | 12.3 | 0.06 | 14.8 | ++ | 58.0 | + | 15.9 | ++ |
| HB3A | 16.0 | 0.13 | 8.26 | +++ | 16.9 | ++ | 18.0 | ++ |
| SD01 | 34.3 | 0.30 | 9.21 | +++ | 15.9 | ++ | 18.0 | ++ |
| SD07 | 31.4 | 0.64 | 7.20 | +++ | 17.2 | ++ | 2.63 | +++ |
| SD08 | 29.3 | 0.36 | 3.20 | +++ | 2.71 | +++ | 3.09 | +++ |
| SD13 | 37.0 | 0.41 | 20.7 | ++ | 17.8 | ++ | 16.7 | ++ |
| SD14 | 27.4 | 0.27 | 13.8 | ++ | 15.9 | ++ | 17.4 | ++ |
| SD18 | 44.1 | 0.09 | 1.25 | +++ | 2.00 | +++ | 20.6 | ++ |
| SD21 | 35.6 | 0.28 | 7.58 | +++ | 15.2 | ++ | 16.9 | ++ |
| SD23 | 23.5 | 0.51 | 31.3 | ++ | 12.1 | ++ | 49.2 | + |
| SD24 | 23.3 | 0.37 | 14.9 | ++ | 21.1 | ++ | 45.7 | + |
| SD28 | 23.0 | 0.51 | 55.7 | + | 55.7 | + | 46.8 | + |
| SD37 | 49.6 | 0.80 | 7.39 | +++ | 10.7 | ++ | 10.5 | ++ |

Shaded values indicate ≥ 10% change from whole porewater response.

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

3 - Rankings for impacts to *Mulinia* normal larval development:

High (+++) <10 %; Intermediate (++) ≥10 and <40%; Low (+) ≥40 and <70%; Non-toxic (-) ≥70%.

Table 3.1-5. Results of *Ampelisca abdita* survival and *Mulinia lateralis* larval development tests with *Ulva lactula* treated porewater collected from the Raymark study area.

| | | | ULVA-treated Porewater Toxicity[1] | | | |
|---|---|---|---|---|---|---|
| | Ammonia (mg/L) | | Amphipod Survival | | Bivalve Development | |
| Station | Total | Unionized | 96-H LC20 (%)[2] | Flag[3] | 48-H EC20 (%)[4] | Flag[5] |
| A3SD10 | 1.38 | 0.01 | 100 | - | 1.25 | +++ |
| CSD1 | 0.47 | 0.03 | 100 | - | 2.67 | +++ |
| GM08 | 0.12 | 0.00 | 100 | - | 1.25 | +++ |
| HB3A | 1.55 | 0.03 | 24.0 | ++ | 1.25 | +++ |
| SD01 | 1.11 | 0.03 | 72.8 | + | 2.14 | +++ |
| SD07 | 1.88 | 0.09 | 100 | - | 1.64 | +++ |
| SD08 | 0.53 | 0.03 | 100 | - | 11.1 | ++ |
| SD13 | 0.70 | 0.02 | 100 | - | 10.8 | ++ |
| SD14 | 1.50 | 0.04 | 43.6 | ++ | 10.3 | ++ |
| SD18 | 4.20 | 0.09 | 20.0 | +++ | 5.91 | +++ |
| SD21 | 1.00 | 0.04 | 46.9 | ++ | 1.25 | +++ |
| SD23 | 2.82 | 0.04 | 100 | - | 0.38 | +++ |
| SD24 | 0.86 | 0.03 | 100 | - | 2.78 | +++ |
| SD28 | 0.86 | 0.04 | 100 | - | 13.8 | ++ |
| SD37 | 3.00 | 0.11 | 100 | - | 2.24 | +++ |

Shaded values indicate ≥ 10% change from whole porewater response.

1- See Appendix B-4 for toxicity data.

2 - Lethal Concentration - 50% (concentration of porewater causing 50% mortality in test species).

3 - Rankings for *Ampelisca* survival:

High (+++) < 20 %; Intermediate (++) < 50%; Low (+) < 80%; Non-toxic (-) ≥ 80%.

4 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

3 - Rankings for impacts to *Mulinia* normal larval development:

High (+++) <10 %; Intermediate (++) ≥10 and <40%; Low (+) ≥40 and <70%; Non-toxic (-) ≥70%.

Table 3.2-1. Summary of sediment chemistry for the Raymark study area. HQ benchmark = ER-M reference data.

| Class | Analyte | A3SD10 | | | CSD1 | | | GM08 | | | HB3A | | | SD01 | | | SD07 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 2.00 | 0.54 | - | 3.00 | 0.81 | - | 3.00 | 0.81 | - | 2.40 | 0.65 | - | 1.40 | 0.38 | - | 1.50 | 0.41 | - |
| | Arsenic | 23.9 | 0.34 | - | 11.2 | 0.16 | - | 17.9 | 0.26 | - | 9.20 | 0.13 | - | 7.00 | 0.10 | - | 10.60 | 0.15 | - |
| | Cadmium | 8.30 | 9.2E-3 | - | 1.20 | 1.3E-3 | - | 1.50 | 1.7E-3 | - | 1.00 | 1.1E-3 | - | 5.50 | 6.1E-3 | - | 4.40 | 4.9E-3 | - |
| | Chromium | 463 | 1.25 | + | 402 | 1.09 | + | 231 | 0.62 | - | 290 | 0.78 | - | 89.7 | 0.24 | - | 99.9 | 0.27 | - |
| | Copper | 2550 | 9.44 | ++ | 1350 | 5.00 | ++ | 661 | 2.45 | ++ | 36400 | 135 | +++ | 1650 | 6.11 | ++ | 430 | 1.59 | + |
| | Mercury | 0.43 | 0.61 | - | 0.77 | 1.08 | + | 1.20 | 1.69 | + | 0.47 | 0.66 | - | 0.22 | 0.31 | - | 0.32 | 0.45 | - |
| | Nickel | 317 | 6.14 | ++ | 54.0 | 1.05 | + | 37.4 | 0.72 | - | 386 | 7.48 | ++ | 80.7 | 1.56 | + | 49.2 | 0.95 | - |
| | Lead | 3290 | 15.1 | +++ | 703 | 3.22 | ++ | 158 | 0.72 | - | 26500 | 122 | +++ | 1570 | 7.20 | ++ | 403 | 1.85 | + |
| | Zinc | 1340 | 3.27 | ++ | 399 | 0.97 | - | 292 | 0.71 | - | 2320 | 5.66 | ++ | 750 | 1.83 | + | 508 | 1.24 | + |
| | Metals Hazard Index[4] | | 36.7 | | | 13.4 | | | 7.99 | | | 272 | | | 17.7 | | | 6.92 | |
| PAHs | 2-Methylnaphthalene | 1000 | 1.49 | + | 660 | 0.99 | - | 660 | 0.99 | - | 660 | 0.99 | - | 710 | 1.06 | + | 650 | 0.97 | - |
| | Acenaphthene | 1000 | 2.00 | + | 660 | 1.32 | + | 660 | 1.32 | + | 660 | 1.32 | + | 140 | 0.28 | - | 160 | 0.32 | - |
| | Acenaphthylene | 190 | 0.30 | - | 200 | 0.31 | - | 660 | 1.03 | + | 660 | 1.03 | + | 350 | 0.55 | - | 330 | 0.52 | - |
| | Anthracene | 120 | 0.11 | - | 190 | 0.17 | - | 660 | 0.60 | - | 660 | 0.60 | - | 520 | 0.47 | - | 520 | 0.47 | - |
| | Benzo(a)anthracene | 1500 | 0.94 | - | 560 | 0.35 | - | 190 | 0.12 | - | 660 | 0.41 | - | 2500 | 1.56 | + | 2700 | 1.69 | + |
| | Benzo(a)pyrene | 1700 | 1.06 | + | 660 | 0.41 | - | 230 | 0.14 | - | 120 | 0.08 | - | 2400 | 1.50 | + | 2200 | 1.38 | + |
| | Chrysene | 2800 | 1.00 | - | 850 | 0.30 | - | 400 | 0.14 | - | 180 | 0.06 | - | 4000 | 1.43 | + | 4000 | 1.43 | + |
| | Dibenz(a,h)anthracene | 260 | 1.00 | - | 190 | 0.73 | - | 74.0 | 0.28 | - | 660 | 2.54 | ++ | 460 | 1.77 | + | 530 | 2.04 | ++ |
| | Fluoranthene | 950 | 0.19 | - | 470 | 0.09 | - | 390 | 0.08 | - | 660 | 0.13 | - | 1400 | 0.27 | - | 4200 | 0.82 | - |
| | Fluorene | 1400 | 2.59 | ++ | 730 | 1.35 | + | 220 | 0.41 | - | 1100 | 2.04 | ++ | 3800 | 7.04 | ++ | 3900 | 7.22 | ++ |
| | Naphthalene | 240 | 0.11 | - | 660 | 0.31 | - | 660 | 0.31 | - | 660 | 0.31 | - | 430 | 0.20 | - | 520 | 0.25 | - |
| | Phenanthrene | 4500 | 3.00 | ++ | 1200 | 0.80 | - | 330 | 0.22 | - | 280 | 0.19 | - | 5600 | 3.73 | ++ | 4500 | 3.00 | ++ |
| | Pyrene | 1000 | 0.38 | - | 660 | 0.25 | - | 660 | 0.25 | - | 660 | 0.25 | - | 190 | 0.07 | - | 260 | 0.10 | - |
| | PAH Hazard Index[4] | | 14.2 | | | 7.40 | | | 5.90 | | | 9.95 | | | 19.9 | | | 20.2 | |
| PCBs | Total PCBs | 27081 | 150 | +++ | 6006 | 33.4 | +++ | 247 | 1.37 | + | 317183 | 1762 | +++ | 20718 | 115 | +++ | 2355 | 13.1 | +++ |
| | Sum of Aroclors[5] | | | | | | | | | | 39526 | | | | | | 1760 | | |
| PSTs | p,p'-DDE | | | | | | | | | | 3.60 | 0.13 | - | | | | 7.20 | 0.27 | - |

1 - Concentration units: metals = µg/g dry weight; PAHs, PCBs, pesticides = ng/g dry weight. See Appendix A-1-1 for sediment concentrations.

2 - Hazard Quotients calculated as sediment concentration/ER-M benchmark (Long *et al.*, 1995).

3 - HQ Ranking: "-" = HQ<1; "+" = HQ>1; "++" = HQ>2; "+++" = HQ>10.

4 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

5 - ER-M benchmarks not availabe for these analytes. Rankings reflect concentrations as follows: "-" = <100 ng/g, "+" = >100 ng/g; "++" = >1000 ng/g; +++ = >10000 ng/g

Table 3.2-1 (continued). Summary of sediment chemistry for the Raymark study area. HQ benchmark = ER-M reference data.

| Class | Analyte | SD08 | | | SD13 | | | SD14 | | | SD18 | | | SD21 | | | SD23 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 1.40 | 0.38 | - | 1.40 | 0.38 | - | 0.88 | 0.24 | - | 0.44 | 0.12 | - | 0.54 | 0.14 | - | 0.93 | 0.25 | - |
| | Arsenic | 6.50 | 0.09 | - | 9.00 | 0.13 | - | 9.20 | 0.13 | - | 3.70 | 0.05 | - | 3.90 | 0.06 | - | 8.80 | 0.13 | - |
| | Cadmium | 1.40 | 1.5E-3 | - | 7.60 | 8.4E-3 | - | 7.60 | 8.4E-3 | - | 0.80 | 8.8E-4 | - | 3.20 | 3.5E-3 | - | 6.30 | 7.0E-3 | - |
| | Chromium | 84.4 | 0.23 | - | 91.5 | 0.25 | - | 116 | 0.31 | - | 31.8 | 0.09 | - | 37.3 | 0.10 | - | 91.7 | 0.25 | - |
| | Copper | 232 | 0.86 | - | 890 | 3.30 | ++ | 775 | 2.87 | ++ | 271 | 1.00 | + | 188 | 0.70 | - | 462 | 1.71 | + |
| | Mercury | 0.37 | 0.52 | - | 0.28 | 0.39 | - | 0.49 | 0.69 | - | 0.16 | 0.23 | - | 0.16 | 0.22 | - | 0.28 | 0.39 | - |
| | Nickel | 37.1 | 0.72 | - | 59.1 | 1.15 | + | 86.3 | 1.67 | + | 20.8 | 0.40 | - | 22.6 | 0.44 | - | 52.1 | 1.01 | + |
| | Lead | 181 | 0.83 | - | 934 | 4.28 | ++ | 833 | 3.82 | ++ | 357 | 1.64 | + | 249 | 1.14 | + | 514 | 2.36 | ++ |
| | Zinc | 290 | 0.71 | - | 671 | 1.64 | + | 676 | 1.65 | + | 181 | 0.44 | - | 274 | 0.67 | - | 525 | 1.28 | + |
| | Metals Hazard Index[4] | | 4.34 | | | 11.5 | | | 11.4 | | | 3.97 | | | 3.46 | | | 7.39 | |
| PAHs | 2-Methylnaphthalene | 660 | 0.99 | - | 1000 | 1.49 | + | 1700 | 2.54 | ++ | 610 | 0.91 | - | 615 | 0.92 | - | 990 | 1.48 | + |
| | Acenaphthene | 660 | 1.32 | + | 200 | 0.40 | - | 200 | 0.40 | - | 610 | 1.22 | + | 85.0 | 0.17 | - | 160 | 0.32 | - |
| | Acenaphthylene | 130 | 0.20 | - | 410 | 0.64 | - | 440 | 0.69 | - | 140 | 0.22 | - | 165 | 0.26 | - | 340 | 0.53 | - |
| | Anthracene | 140 | 0.13 | - | 680 | 0.62 | - | 640 | 0.58 | - | 250 | 0.23 | - | 305 | 0.28 | - | 570 | 0.52 | - |
| | Benzo(a)anthracene | 670 | 0.42 | - | 4000 | 2.50 | ++ | 3800 | 2.38 | ++ | 800 | 0.50 | - | 1450 | 0.91 | - | 2900 | 1.81 | + |
| | Benzo(a)pyrene | 640 | 0.40 | - | 4000 | 2.50 | ++ | 3600 | 2.25 | ++ | 790 | 0.49 | - | 1400 | 0.88 | - | 2900 | 1.81 | + |
| | Chrysene | 1000 | 0.36 | - | 10000 | 3.57 | ++ | 9200 | 3.29 | ++ | 1200 | 0.43 | - | 2000 | 0.71 | - | 4500 | 1.61 | + |
| | Dibenz(a,h)anthracene | 190 | 0.73 | - | 1100 | 4.23 | ++ | 1000 | 3.85 | ++ | 320 | 1.23 | + | 345 | 1.33 | + | 940 | 3.62 | ++ |
| | Fluoranthene | 380 | 0.07 | - | 9100 | 1.78 | + | 8400 | 1.65 | + | 600 | 0.12 | - | 895 | 0.18 | - | 1800 | 0.35 | - |
| | Fluorene | 990 | 1.83 | + | 5300 | 9.81 | ++ | 4800 | 8.89 | ++ | 1100 | 2.04 | ++ | 1950 | 3.61 | ++ | 4400 | 8.15 | ++ |
| | Naphthalene | 120 | 0.06 | - | 610 | 0.29 | - | 550 | 0.26 | - | 160 | 0.08 | - | 270 | 0.13 | - | 550 | 0.26 | - |
| | Phenanthrene | 1500 | 1.00 | - | 11000 | 7.33 | ++ | 11000 | 7.33 | ++ | 1500 | 1.00 | - | 3450 | 2.30 | ++ | 7900 | 5.27 | ++ |
| | Pyrene | 660 | 0.25 | - | 220 | 0.08 | - | 360 | 0.14 | - | 75.0 | 0.03 | - | 140 | 0.05 | - | 220 | 0.08 | - |
| | PAH Hazard Index[4] | | 7.76 | | | 35.3 | | | 34.2 | | | 8.49 | | | 11.7 | | | 25.8 | |
| PCBs | Total PCBs | 967 | 5.37 | ++ | 8661 | 48.1 | +++ | 4642 | 25.79 | +++ | 2428 | 13.49 | +++ | 1268 | 7.04 | ++ | 4119 | 22.88 | +++ |
| | Sum of Aroclors[5] | | | | | | | | | | | | | 954 | | | | | |
| PSTs | p,p'-DDE | | | | | | | | | | | | | 5.40 | 0.20 | - | | | |

1 - Concentration units: metals = µg/g dry weight; PAHs, PCBs, pesticides = ng/g dry weight. See Appendix A-1-1 for sediment concentrations.

2 - Hazard Quotients calculated as sediment concentration/ER-M benchmark (Long *et al*., 1995).

3 - HQ Ranking: "-" = HQ<1; "+" = HQ>1; "++" = HQ>2; "+++" = HQ>10.

4 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

5 - ER-M benchmarks not availabe for these analytes. Rankings reflect concentrations as follows: "-" = <100 ng/g; "+" = >100 ng/g, "++" = >1000 ng/g; +++ = >10000 ng/g.

Table 3.2-1 (continued). Summary of sediment chemistry for the Raymark study area. HQ benchmark = ER-M reference data.

| Class | Analyte | SD24 | | | SD28 | | | SD37 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 0.62 | 0.17 | - | 1.60 | 0.43 | - | 0.60 | 0.16 | - |
| | Arsenic | 8.20 | 0.12 | - | 8.10 | 0.12 | - | 4.50 | 0.06 | - |
| | Cadmium | 2.60 | 2.9E-3 | - | 4.20 | 4.6E-3 | - | 0.51 | 5.6E-4 | - |
| | Chromium | 97.4 | 0.26 | - | 107 | 0.29 | - | 59.2 | 0.16 | - |
| | Copper | 383 | 1.42 | + | 361 | 1.34 | + | 173 | 0.64 | - |
| | Mercury | 0.28 | 0.39 | - | 0.27 | 0.38 | - | 0.17 | 0.24 | - |
| | Nickel | 63.3 | 1.23 | + | 43.4 | 0.84 | - | 21.0 | 0.41 | - |
| | Lead | 506 | 2.32 | ++ | 303 | 1.39 | + | 42.3 | 0.19 | - |
| | Zinc | 363 | 0.89 | - | 439 | 1.07 | + | 171 | 0.42 | - |
| | Metals Hazard Index[4] | | 6.80 | | | 5.86 | | | 2.29 | |
| PAHs | 2-Methylnaphthalene | 660 | 0.99 | - | 1000 | 1.49 | + | 570 | 0.85 | - |
| | Acenaphthene | 660 | 1.32 | + | 1000 | 2.00 | + | 570 | 1.14 | + |
| | Acenaphthylene | 110 | 0.17 | - | 200 | 0.31 | - | 84.0 | 0.13 | - |
| | Anthracene | 150 | 0.14 | - | 300 | 0.27 | - | 120 | 0.11 | - |
| | Benzo(a)anthracene | 890 | 0.56 | - | 1700 | 1.06 | + | 430 | 0.27 | - |
| | Benzo(a)pyrene | 960 | 0.60 | - | 1900 | 1.19 | + | 470 | 0.29 | - |
| | Chrysene | 1600 | 0.57 | - | 3400 | 1.21 | + | 900 | 0.32 | - |
| | Dibenz(a,h)anthracene | 310 | 1.19 | + | 600 | 2.31 | ++ | 150 | 0.58 | - |
| | Fluoranthene | 670 | 0.13 | - | 1100 | 0.22 | - | 820 | 0.16 | - |
| | Fluorene | 1200 | 2.22 | ++ | 2300 | 4.26 | ++ | 540 | 1.00 | - |
| | Naphthalene | 160 | 0.08 | - | 310 | 0.15 | - | 570 | 0.27 | - |
| | Phenanthrene | 2400 | 1.60 | + | 4900 | 3.27 | ++ | 860 | 0.57 | - |
| | Pyrene | 83.0 | 0.03 | - | 130 | 0.05 | - | 570 | 0.22 | - |
| | PAH Hazard Index[4] | | 9.60 | | | 17.8 | | | 5.92 | |
| PCBs | Total PCBs | 4865 | 27.03 | +++ | 2383 | 13.24 | +++ | 104.5 | 0.58 | - |
| | Sum of Aroclors[5] | | | | | | | | | |
| PSTs | p,p'-DDE | | | | | | | | | |

Table 3.2-2. Summary of porewater chemistry for the Raymark study area.

| Class | Analyte | A3SD10 | | | CSD1 | | | GM08 | | | HB3A | | | SD01 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - |
| | Arsenic | 19.9 | 0.55 | - | 58.7 | 1.63 | + | 20.1 | 0.56 | - | 33.5 | 0.93 | - | | | |
| | Cadmium | 5.60 | 0.16 | - | 3.68 | 0.10 | - | 0.17 | 4.7E-3 | - | 3.17 | 8.8E-2 | - | 2.83 | 7.9E-2 | - |
| | Chromium | 1.47 | 2.9E-2 | - | 2.64 | 5.3E-2 | - | 1.69 | 3.4E-2 | - | 0.84 | 1.7E-2 | - | 3.24 | 6.5E-2 | - |
| | Copper | 65.0 | 3.17 | ++ | 71.0 | 3.46 | ++ | 55.0 | 2.68 | ++ | 599 | 29.2 | +++ | 112 | 5.46 | ++ |
| | Nickel | 244 | 0.10 | - | 14.2 | 5.9E-3 | - | 32.0 | 1.3E-2 | - | 112 | 4.7E-2 | - | 27.3 | 1.1E-2 | - |
| | Lead | 1.40 | 4.6E-4 | - | 1.44 | 4.8E-4 | - | 1.56 | 5.2E-4 | - | 13.2 | 4.4E-3 | - | 2.80 | 9.3E-4 | - |
| | Zinc | 1540 | 4.49 | ++ | 260 | 0.76 | - | 420 | 1.22 | + | 170 | 0.50 | - | 170 | 0.50 | - |
| | Metals Hazard Index[4] | | 8.50 | | | 6.01 | | | 4.52 | | | 30.8 | | | 6.12 | |
| PAHs | PAH Hazard Index[4] | | | | | | | | | | | | | | | |
| PCBs | Total PCBs | | | | 1093 | 27.3 | +++ | | | | | | | | | |

1 - Concentration units: µg/L. See Appendix A-1-2 for porewater concentrations.

2 - Hazard Quotients calculated as sediment concentration/WQSV benchmark (see Appendix A-2-2).

3 - HQ Ranking: "-" = HQ<1; "+" = HQ>1; "++" = HQ>2; "+++" = HQ>10.

4 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

Table 3.2-2 (continued). Summary of porewater chemistry for the Raymark study area.

| Class | Analyte | SD07 | | | SD08 | | | SD13 | | | SD14 | | | SD18 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - |
| | Arsenic | 95.2 | 2.64 | ++ | 80.8 | 2.24 | ++ | 73.6 | 2.04 | ++ | 17.5 | 0.49 | - | 15.7 | 0.22 | - |
| | Cadmium | 3.86 | 0.11 | - | 1.60 | 4.4E-2 | - | 2.78 | 7.7E-2 | - | 3.27 | 9.1E-2 | - | 3.45 | 1.8E-2 | - |
| | Chromium | 1.05 | 2.1E-2 | - | | | | 2.81 | 5.6E-2 | - | 3.14 | 6.3E-2 | - | 1.33 | 3.8E-2 | - |
| | Copper | 54.0 | 2.63 | ++ | 32.0 | 1.56 | + | 46.0 | 2.24 | ++ | 48.0 | 2.34 | ++ | 52.0 | | |
| | Nickel | 15.3 | 6.4E-3 | - | 41.0 | 1.7E-2 | - | 4.00 | 1.7E-3 | - | 31.0 | 1.3E-2 | - | 16.4 | 5.3E-3 | - |
| | Lead | 0.75 | 2.5E-4 | - | 1.72 | 5.7E-4 | - | 0.75 | 2.5E-4 | - | 3.56 | 1.2E-3 | - | 1.96 | 3.3E-4 | - |
| | Zinc | 150 | 0.44 | - | 200 | 0.58 | - | 140 | 0.41 | - | 270 | 0.79 | - | 130 | 0.12 | - |
| | Metals Hazard Index[4] | | 5.85 | | | 4.45 | | | 4.8 | | | 3.78 | | | 0.40 | |
| PAHs | PAH Hazard Index[4] | | | | | | | | 40.4 | +++ | | | | | | |
| PCBs | Total PCBs | 2084 | 52.1 | +++ | 2000 | 50.0 | +++ | 504 | 12.6 | +++ | | | | | | |

1 - Concentration units: µg/L. See Appendix A-1-2 for porewater concentrations.

2 - Hazard Quotients calculated as sediment concentration/WQSV benchmark (see Appendix A-2-2).

3 - HQ Ranking: "-" = HQ<1; "+" = HQ>1; "++" = HQ>2; "+++" = HQ>10.

4 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

Table 3.2-2 (continued). Summary of porewater chemistry for the Raymark study area.

| Class | Analyte | SD21 | | | SD23 | | | SD24 | | | SD28 | | | SD37 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] | Conc[1] | HQ[2] | Rank[3] |
| Metals | Silver | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - | 0.00 | 0.00 | - |
| | Arsenic | 12.0 | 0.33 | - | 34.6 | 0.96 | - | 11.8 | 0.33 | - | 19.1 | 0.53 | - | 18.0 | 0.50 | - |
| | Cadmium | 3.41 | 9.5E-2 | - | 3.33 | 9.2E-2 | - | 2.80 | 7.8E-2 | - | 3.71 | 0.10 | - | 2.95 | 8.2E-2 | - |
| | Chromium | 0.67 | 1.3E-2 | - | 3.24 | 6.5E-2 | - | 2.36 | 4.7E-2 | - | | | | | | |
| | Copper | 50.5 | 2.46 | ++ | 35.0 | 1.71 | + | 41.0 | 2.00 | + | 55.0 | 2.68 | ++ | 54.0 | 2.63 | ++ |
| | Nickel | 15.0 | 6.3E-3 | - | 9.50 | 4.0E-3 | - | 14.9 | 6.2E-3 | - | 7.40 | 3.1E-3 | - | | | |
| | Lead | 2.26 | 7.5E-4 | - | 3.92 | 1.3E-3 | - | 4.40 | 1.5E-3 | - | 2.76 | 9.1E-4 | - | 8.96 | 3.0E-3 | - |
| | Zinc | 115 | 0.34 | - | 60.0 | 0.17 | - | 50.0 | 0.15 | - | 260 | 0.76 | - | 50.0 | 0.15 | - |
| | **Metals Hazard Index[4]** | | 3.25 | | | 3.01 | | | 2.61 | | | 4.08 | | | 3.37 | |
| PAHs | **PAH Hazard Index[4]** | | | | | | | | | | | | | | | |
| PCBs | Total PCBs | | | | 1144 | 28.6 | +++ | | | | 2212 | 55.3 | +++ | | | |

1 - Concentration units: µg/L. See Appendix A-1-2 fo 1 - Concentration units: µg/L. See Appendix A-1-2 for porewater concentrations.

2 - Hazard Quotients calculated as sediment concentration/WQSV benchmark (see Appendix A-2-2).

3 - HQ Ranking: "-" = HQ<1; "+" = HQ>1; "++" = HQ>2; "+++" = HQ>10.

4 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

Table 3.4-1. Exposure-response analysis for **porewater**-related CoC toxicity: A) *Ampelisca*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metals | | | | | Organics | | | |
| Station | EC20% | Tox-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ | PCBs | PAHs | $\Sigma IWTU_{PW}$ | $NH_4$-TOT |
| SD18 | 25.0 | I | 0.2 | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | 1.5 |
| SD37 | 28.1 | I | 0.5 | 0.1 | 2.6 | 0.1 | 3.4 | 0.0 | 0.0 | 0.0 | **1.7** |
| SD01 | 40.0 | I | 0.0 | 0.1 | **5.5** | 0.5 | **6.0** | 0.0 | 0.0 | 0.0 | **1.1** |
| SD08 | 43.5 | I | **2.2** | 0.0 | 1.6 | 0.6 | 4.4 | 50.0 | 0.0 | 50.0 | 1.0 |
| SD24 | 51.7 | L | 0.3 | 0.1 | 2.0 | 0.1 | 2.6 | 0.0 | 0.0 | 0.0 | 0.8 |
| SD07 | 60.0 | L | **2.6** | 0.1 | 2.6 | 0.4 | **5.8** | 52.1 | 0.0 | 52.1 | 1.0 |
| SD13 | 60.0 | L | **2.0** | 0.1 | 2.2 | 0.4 | **4.8** | 12.6 | 0.0 | 12.6 | 1.2 |
| SD14 | 60.0 | L | 0.5 | 0.1 | 2.3 | 0.8 | 3.7 | 0.0 | 0.0 | 0.0 | 0.9 |
| SD23 | 60.0 | L | 1.0 | 0.1 | 1.7 | 0.2 | 2.9 | 28.6 | 0.0 | 28.6 | 0.8 |
| SD21 | 60.7 | L | 0.3 | 0.1 | 2.5 | 0.3 | 3.2 | 0.0 | 0.0 | 0.0 | **1.2** |
| CSD1 | 64.3 | L | **1.6** | 0.1 | **3.5** | 0.8 | **6.0** | 27.3 | 0.0 | 27.3 | 0.5 |
| HB3A | 66.7 | L | 0.9 | 0.1 | **29.2** | 0.5 | **30.7** | 0.0 | 0.0 | 0.0 | 0.5 |
| A3SD10 | 77.3 | L | 0.6 | 0.2 | **3.2** | **4.5** | **8.4** | 0.0 | 0.0 | 0.0 | 0.7 |
| GM08 | 80.0 | N | 0.6 | 0.0 | 2.7 | 1.2 | 4.5 | 0.0 | 0.0 | 0.0 | 0.4 |
| SD28 | 100 | N | 0.5 | 0.1 | 2.7 | 0.8 | 4.1 | 55.7 | 0.0 | 63.2 | 0.8 |
| Threshold Effects Quotient[1] | | | 1.0 | 1.0 | 2.7 | 1.2 | 4.5 | 55.7 | 1.0 | 63.2 | 1.0 |
| % > TEQ | | | 30.8% | 0.0% | 30.8% | 7.7% | 46.2% | 0.0% | 0.0% | 0.0% | 23.1% |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <20 %; Intermediate (I) ≥20 and <50%; Low (L) ≥50 and <80%; Non-toxic (N) >80%.

Table 3.4-1 (continued). Exposure-response analysis for **porewater**-related CoC toxicity: B) *Mulinia*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metals | | | | | Organics | | | |
| Station | EC20% | Tox-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ | PCBs | PAHs | $\Sigma IWTU_{PW}$ | $NH_4$-TOT |
| A3SD10 | 0.41 | H | 0.6 | 0.2 | **3.2** | **4.5** | **8.4** | 0.0 | 0.0 | 0.0 | 1.5 |
| SD18 | 1.25 | H | 0.2 | 0.0 | 0.0 | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | **3.3** |
| SD08 | 3.20 | H | **2.2** | 0.0 | 1.6 | 0.6 | **4.4** | 50.0 | 0.0 | 50.0 | **2.2** |
| SD07 | 7.20 | H | **2.6** | 0.1 | 2.6 | 0.4 | **5.8** | 52.1 | 0.0 | 52.1 | **2.3** |
| SD37 | 7.39 | H | 0.5 | 0.1 | 2.6 | 0.1 | 3.4 | 0.0 | 0.0 | 0.0 | **3.7** |
| SD21 | 7.58 | H | 0.3 | 0.1 | 2.5 | 0.3 | 3.2 | 0.0 | 0.0 | 0.0 | **2.7** |
| HB3A | 8.26 | H | 0.9 | 0.1 | **29.2** | 0.5 | **30.7** | 0.0 | 0.0 | 0.0 | 1.2 |
| SD01 | 9.21 | H | 0.0 | 0.1 | **5.5** | 0.5 | **6.0** | 0.0 | 0.0 | 0.0 | **2.6** |
| CSD1 | 11.7 | I | **1.6** | 0.1 | **3.5** | 0.8 | **6.0** | 27.3 | 0.0 | 27.3 | 1.2 |
| SD14 | 13.8 | I | 0.5 | 0.1 | 2.3 | 0.8 | 3.7 | 0.0 | 0.0 | 0.0 | **2.0** |
| GM08 | 14.8 | I | 0.6 | 0.0 | 2.7 | **1.2** | **4.5** | 0.0 | 0.0 | 0.0 | 0.9 |
| SD24 | 14.9 | I | 0.3 | 0.1 | 2.0 | 0.1 | 2.6 | 0.0 | 0.0 | 0.0 | 1.7 |
| SD13 | 20.7 | I | **2.0** | 0.1 | 2.2 | 0.4 | **4.8** | 12.6 | 0.0 | 12.6 | **2.8** |
| SD23 | 31.3 | I | 1.0 | 0.1 | 1.7 | 0.2 | 2.9 | 28.6 | 0.0 | 28.6 | 1.8 |
| SD28 | 55.7 | L | 0.5 | 0.1 | 2.7 | 0.8 | 4.1 | 55.7 | 0.0 | 55.7 | 1.7 |
| Threshold Effects Quotient[1] | | | 1.0 | 1.0 | 2.7 | 1.0 | 4.1 | 55.7 | 1.0 | 55.7 | 1.8 |
| % > TEQ | | | 28.6% | 0.0% | 28.6% | 14.3% | 57.1% | 0.0% | 0.0% | 0.0% | 57.1% |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <10 %; Intermediate (I) ≥10 and <40%; Low (L) ≥40 and <70%; Non-toxic (N) ≥70%.

Table 3.4-2. Exposure-response analysis for **C18-treated** (e.g., metals-related) porewater: A) *Ampelisca*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Metals | | | | |
| Station | EC20% | TOX-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ |
| SD18 | 18.0 | H | 0.06 | 0.03 | 0.00 | 0.20 | 0.29 |
| HB3A | 22.7 | I | 0.03 | 0.14 | **4.10** | 0.67 | 4.95 |
| SD37 | 55.0 | L | 0.15 | 0.16 | **1.51** | 0.17 | 2.00 |
| SD01 | 55.6 | L | 0.00 | 0.09 | 0.73 | 0.50 | 1.32 |
| SD08 | 60.0 | L | 1.61 | 0.16 | 0.93 | 0.26 | 2.96 |
| SD13 | 60.0 | L | 0.15 | 0.10 | 1.02 | 0.35 | 1.63 |
| SD14 | 60.0 | L | 0.00 | 0.13 | 0.88 | 0.41 | 1.41 |
| SD21 | 60.0 | L | 0.04 | 0.12 | 0.54 | 0.22 | 0.91 |
| SD23 | 60.0 | L | 0.28 | 0.13 | 1.37 | 0.12 | 1.90 |
| SD24 | 60.0 | L | 0.00 | 0.10 | 0.88 | 0.15 | 1.13 |
| CSD1 | 83.3 | N | 1.14 | 0.24 | 0.93 | 0.29 | 2.59 |
| SD07 | 83.3 | N | 1.77 | 0.15 | 1.46 | 0.20 | 3.58 |
| A3SD10 | 100 | N | 0.02 | 0.26 | 1.12 | 7.00 | 8.40 |
| GM08 | 100 | N | 0.06 | 0.18 | 1.37 | 1.49 | 3.09 |
| SD28 | 100 | N | 1.47 | 0.26 | 1.27 | 0.20 | 3.20 |
| Threshold Effects Quotient[1] | | | 1.77 | 1.00 | 1.46 | 7.00 | 8.40 |
| % > TEQ | | | 0.0% | 0.00% | 20.0% | 0.00% | 0.00% |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <20 %; Intermediate (I) ≥20 and <50%; Low (L) ≥50 and <80%; Non-toxic (N) >80%.

Table 3.4-2 (continued). Exposure-response analysis for **C18-treated** (e.g., metals-related) porewater: B) *Mulinia*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | Metals | | | | |
| Station | EC20% | TOX-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ |
| A3SD10 | 2.05 | H | 0.02 | 0.26 | 1.12 | **7.00** | **8.40** |
| CSD1 | 2.46 | H | 1.14 | 0.24 | 0.93 | 0.29 | 2.59 |
| SD07 | 2.63 | H | **1.77** | 0.15 | **1.46** | 0.20 | **3.58** |
| SD08 | 3.09 | H | **1.61** | 0.16 | 0.93 | 0.26 | 2.96 |
| SD21 | 16.9 | I | 0.04 | 0.12 | 0.54 | 0.22 | 0.91 |
| SD37 | 10.5 | I | 0.15 | 0.16 | **1.51** | 0.17 | 2.00 |
| GM08 | 15.9 | I | 0.06 | 0.18 | 1.37 | **1.49** | 3.09 |
| SD13 | 16.7 | I | 0.15 | 0.10 | 1.02 | 0.35 | 1.63 |
| SD14 | 17.4 | I | 0.00 | 0.13 | 0.88 | 0.41 | 1.41 |
| HB3A | 18.0 | I | 0.03 | 0.14 | **4.10** | 0.67 | **4.95** |
| SD01 | 18.0 | I | 0.00 | 0.09 | 0.73 | 0.50 | 1.32 |
| SD18 | 20.6 | I | 0.06 | 0.03 | 0.00 | 0.20 | 0.29 |
| SD24 | 45.7 | L | 0.00 | 0.10 | 0.88 | 0.15 | 1.13 |
| SD28 | 46.8 | L | 1.47 | 0.26 | 1.27 | 0.20 | 3.20 |
| SD23 | 49.2 | L | 0.28 | 0.13 | 1.37 | 0.12 | 1.90 |
| Threshold Effects Quotient[1] | | | 1.47 | 1.00 | 1.37 | 1.00 | 3.20 |
| % > TEQ | | | 16.7% | 0.00% | 25.0% | 16.7% | 25.0% |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <10 %; Intermediate (I) ≥10 and <40%; Low (L) ≥40 and <70%; Non-toxic (N) ≥70%.

Table 3.4-3. Exposure-response analysis for **EDTA-treated** (e.g., organics-related) porewater:
A) *Ampelisca*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | |
|---|---|---|---|---|---|
| | | | Organics | | |
| Station | EC20% | Tox-GRP[2] | PCBs | PAHs | $\Sigma IWTU_{PW}$ |
| SD18 | 18.0 | H | 0.00 | 0.00 | 0.00 |
| SD14 | 55.6 | I | 0.00 | 0.00 | 0.00 |
| SD37 | 57.9 | I | 0.00 | 0.00 | 0.00 |
| HB3A | 60.0 | I | 0.00 | 0.00 | 0.00 |
| SD01 | 60.0 | I | 0.00 | 0.00 | 0.00 |
| SD08 | 60.0 | I | 0.32 | 0.00 | 0.32 |
| SD13 | 60.0 | I | **3.74** | 0.00 | **3.74** |
| SD21 | 60.0 | I | 0.00 | 0.00 | 0.00 |
| SD23 | 60.0 | I | **1.58** | 0.00 | **1.58** |
| SD24 | 61.1 | I | 0.00 | 0.00 | 0.00 |
| SD07 | 62.5 | I | 0.00 | 0.00 | 0.00 |
| CSD1 | 70.0 | I | 0.00 | 0.00 | 0.00 |
| SD28 | 100 | N | 0.00 | 0.00 | 0.00 |
| A3SD10 | 100 | N | 0.00 | 0.00 | 0.00 |
| GM08 | 100 | N | 0.00 | 0.00 | 0.00 |
| Threshold Effects Quotient[1] | | | 1.00 | 1.00 | 1.00 |
| % > TEQ | | | 16.7% | 0.00% | 16.7% |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <20 %; Intermediate (I) ≥20 and <50%; Low (L) ≥50 and <80%; Non-toxic (N) >80%.

Table 3.4-3 (continued). Exposure-response analysis for **EDTA-treated** (e.g., organics-related) porewater: B) *Mulinia*.

| | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | |
|---|---|---|---|---|---|
| | | | Organics | | |
| Station | EC20% | Tox-GRP[2] | PCBs | PAHs | $\Sigma IWTU_{PW}$ |
| SD18 | 2.00 | H | 0.00 | 0.00 | 0.00 |
| SD08 | 2.71 | H | 0.32 | 0.00 | 0.32 |
| SD37 | 10.7 | H | 0.00 | 0.00 | 0.00 |
| CSD1 | 11.2 | I | 0.00 | 0.00 | 0.00 |
| SD23 | 12.1 | I | **1.58** | 0.00 | **1.58** |
| SD21 | 15.2 | I | 0.00 | 0.00 | 0.00 |
| SD01 | 15.9 | I | 0.00 | 0.00 | 0.00 |
| SD14 | 15.9 | I | 0.00 | 0.00 | 0.00 |
| HB3A | 16.9 | I | 0.00 | 0.00 | 0.00 |
| A3SD10 | 17.0 | I | 0.00 | 0.00 | 0.00 |
| SD07 | 17.2 | I | 0.00 | 0.00 | 0.00 |
| SD13 | 17.8 | I | **3.74** | 0.00 | **3.74** |
| SD24 | 21.1 | I | 0.00 | 0.00 | 0.00 |
| SD28 | 55.7 | L | 0.00 | 0.00 | 0.00 |
| GM08 | 58.0 | L | 0.00 | 0.00 | 0.00 |
| Threshold Effects Quotient[1] | | | 1.00 | 1.00 | 1.00 |
| % > TEQ | | | 15.4% | 0.00% | 15.4% |

**Bolded values indicate HQs exceeding TEQ.**

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <10 %; Intermediate (I) ≥10 and <40%; Low (L) ≥40 and <70%; Non-toxic (N) ≥70%.

Table 3.4-4. Exposure-response analysis for *Ulva*-treated (e.g., non-ammonia-related) porewater: A) *Ampelisca*.

| | | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metals | | | | | Organics | | | |
| Station | Treatment | EC20% | Tox-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ | PCBs | PAHs | $\Sigma IWTU_{PW}$ | $NH_4$-TOT |
| HB3A | Non-*Ulva* | 77.3 | I | 0.71 | 0.08 | **30.6** | **2.65** | **34.1** | 0.00 | 0.00 | 0.00 | 0.53 |
| SD01 | Non-*Ulva* | 40.0 | I | 0.07 | 0.09 | 1.37 | 0.23 | 1.76 | 0.16 | 0.00 | 0.16 | **1.14** |
| A3SD10 | Non-*Ulva* | 77.3 | L | 0.66 | 0.14 | 2.00 | 0.23 | 3.03 | 0.00 | 0.00 | 0.00 | 0.65 |
| SD28 | Non-*Ulva* | 100 | N | 0.41 | 0.07 | 2.59 | 0.29 | 3.36 | 0.00 | 0.00 | 0.00 | 0.77 |
| Threshold Effects Quotient[1] | | | | 1.00 | 1.00 | 2.59 | 1.00 | 3.36 | 1.00 | 1.00 | 1.00 | 1.00 |
| HB3A | *Ulva* | 24.0 | H | 0.56 | 0.06 | **18.1** | **1.55** | **20.3** | 0.00 | 0.00 | 0.00 | 0.05 |
| SD01 | *Ulva* | 72.8 | L | 0.02 | 0.07 | 1.95 | 0.20 | 2.25 | 0.52 | 0.00 | 0.52 | 0.04 |
| A3SD10 | *Ulva* | 100 | N | 0.52 | 0.13 | 3.41 | 0.35 | 4.41 | 0.00 | 0.00 | 0.00 | 0.05 |
| SD28 | *Ulva* | 100 | N | 0.22 | 0.08 | 3.12 | 0.15 | 3.57 | 0.00 | 0.00 | 0.00 | 0.03 |
| Threshold Effects Quotient[1] | | | | 1.00 | 1.00 | 3.41 | 1.00 | 4.41 | 1.00 | 1.00 | 1.00 | 1.00 |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <20 %; Intermediate (I) ≥20 and <50%; Low (L) ≥50 and <80%; Non-toxic (N) >80%.

Table 3.4-4 (continued). Exposure-response analysis for *Ulva*-treated (e.g., non-ammonia-related) porewater: B) *Mulinia*.

| | | Toxicity | | Interstitial Water Toxic Units (100% Porewater Conc./$LC_{50}$) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Metals | | | | | Organics | | | |
| Station | Treatment | EC20% | Tox-GRP[2] | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ | PCBs | PAHs | $\Sigma IWTU_{PW}$ | $NH_4$-TOT |
| A3SD10 | Non-*Ulva* | 0.41 | H | 0.66 | 0.14 | 2.00 | 0.23 | **3.0** | 0.00 | 0.00 | 0.00 | 1.46 |
| HB3A | Non-*Ulva* | 8.26 | H | 0.71 | 0.08 | **30.6** | **2.65** | 34.07 | 0.00 | 0.00 | 0.00 | 1.19 |
| SD01 | Non-*Ulva* | 9.21 | H | 0.07 | 0.09 | 1.37 | 0.23 | 1.76 | 0.16 | 0.00 | 0.16 | 2.56 |
| SD28 | Non-*Ulva* | 55.7 | L | 0.41 | 0.07 | 2.59 | 0.29 | 3.36 | 0.00 | 0.00 | 0.00 | 1.72 |
| Threshold Effects Quotient[1] | | | | 1.00 | 1.00 | 2.6 | 1.00 | 3.36 | 1.00 | 1.00 | 1.00 | 1.72 |
| A3SD10 | *Ulva* | 1.25 | H | 0.52 | 0.13 | **3.41** | 0.35 | **4.4** | 0.00 | 0.00 | 0.00 | 0.10 |
| HB3A | *Ulva* | 1.25 | H | 0.56 | 0.06 | **18.1** | **1.55** | 20.3 | 0.00 | 0.00 | 0.00 | 0.12 |
| SD01 | *Ulva* | 2.14 | H | 0.02 | 0.07 | 1.95 | 0.20 | 2.25 | 0.52 | 0.00 | 0.52 | 0.08 |
| SD28 | *Ulva* | 13.8 | I | 0.22 | 0.08 | 3.12 | 0.15 | 3.57 | 0.00 | 0.00 | 0.00 | 0.06 |
| Threshold Effects Quotient[1] | | | | 1.00 | 1.00 | 3.1 | 1.00 | 3.6 | 1.00 | 1.00 | 1.00 | 1.00 |

Bolded values indicate HQs exceeding TEQ.

1- TEQ selected as the greater of 1.0 and the maximum value of least toxic sample group.

2- Toxicity Group Classification:

High (H) <10 %; Intermediate (I) ≥10 and <40%; Low (L) ≥40 and <70%; Non-toxic (N) ≥70%.

Table 3.4-5. Summary of exposure-response analyses for porewater and Toxicity Identification Evaluation (TIE) testing for the Raymark study area.

| | | | Threshold Effects Quotient (Interstitial Water Toxic Units, Frequency of Exceedence) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Metals | | | | | Organics | | | |
| TRT | SPP | Statistic | Arsenic | Cadmium | Copper | Zinc | $\Sigma IWTU_{PW}$ | PCBs | PAHs | $\Sigma IWTU_{PW}$ | $NH_4$-TOT |
| PW | AMP | TEQ | 1.00 | 1.00 | 2.68 | 1.22 | 4.47 | 55.7 | 1.00 | 63.2 | 1.00 |
| | MUL | TEQ | 1.00 | 1.00 | 2.68 | 1.00 | 4.07 | 55.7 | 1.00 | 55.7 | 1.75 |
| | AMP | %>TEQ | 30.8% | 0.00% | 30.8% | 7.7% | 46.2% | 0.00% | 0.00% | 0.00% | 23.1[illegible] |
| | MUL | %>TEQ | 28.6% | 0.00% | 28.6% | 14.3% | 57.1% | 0.00% | 0.00% | 0.00% | 57.1[illegible] |
| | *MEDIAN* | *TEQ* | 1.00 | 1.00 | 2.68 | 1.11 | 4.27 | *55.7* | *1.00* | *59.5* | *1.38* |
| | | *%>TEQ* | 29.7% | 0.00% | 29.7% | 11.0% | 51.6% | *0.0%* | *0.00%* | *0.00%* | *40.1%* |
| EDTA | AMP | TEQ | | | | | | 1.00 | 1.00 | 1.00 | 0.00 |
| | MUL | TEQ | | | | | | 1.00 | 1.00 | 1.00 | 0.00 |
| | AMP | %>TEQ | | | | | | 16.7% | 0.00% | 16.7% | 0.[illegible] |
| | MUL | %>TEQ | | | | | | 15.4% | 0.00% | 15.4% | 0.00% |
| | *MEDIAN* | *TEQ* | | | | | | *1.00* | *1.00* | *1.00* | *0.00* |
| | | *%>TEQ* | | | | | | *16.0%* | *0.00%* | *16.0%* | *0.00%* |
| C18 | AMP | TEQ | 1.77 | 1.00 | 1.46 | 7.00 | 8.40 | | | | 0.00 |
| | MUL | TEQ | 1.47 | 1.00 | 1.37 | 1.00 | 3.20 | | | | 0.00 |
| | AMP | %>TEQ | 0.00% | 0.00% | 20.0% | 0.00% | 0.00% | | | | 0.00 |
| | MUL | %>TEQ | 16.7% | 0.00% | 25.0% | 16.7% | 25.0% | | | | 0.00 |
| | *MEDIAN* | *TEQ* | 1.62 | 1.00 | 1.41 | 4.00 | 5.80 | | | | *0.00* |
| | | *%>TEQ* | 8.33% | 0.00% | 22.5% | 8.3% | 12.5% | | | | *0.00%* |
| | Overall | *Mimimum* | 1.00 | 1.00 | 1.41 | 1.11 | 4.27 | 1.00 | 1.00 | 1.00 | 0.00 |
| | | *Maximum* | 1.62 | 1.00 | 2.68 | 4.00 | 5.80 | 55.7 | 1.00 | 59.5 | 1.38 |
| | | %>TEQ | 19.0% | 0.00% | 26.1% | 9.66% | 32.1% | 8.01% | 0.00% | 8.01% | 13.4% |

PW = untreated porewater extracted from sediment, EDTA = treatment for metal chelation experiment, C18 = treatment for organics removal experiment
AMP = Ampelisca, MUL = Mulinia
TEQ = Threshold Effects Quotient = highest observed no effect ratio of porewater concentration to LC50 benchmark
%>TEQ = percentage of stations with IWTU values exceeding the TEQ.
IWTU = Interstitial water toxic units; see Section 4 text.

Appendix A-1-1. Results of chemical analyses of whole sediments collected in the Raymark study area.

| Chemical Class | Analyte | A3SD10 | A3SD10 (B) | CSD1 | GA08 | HB3A | HB3A(B) | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21(A) | SD21(B) | SD23 | SD24 | SD24 (B) | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dioxins | Dibenzofuran | 1000.00 | | 660.00 | 660.00 | 660.00 | | 89.00 | 100.00 | 660.00 | 1000.00 | 1700.00 | 610.00 | 620.00 | 610.00 | 990.00 | 660.00 | | 1000.00 | 570.00 |
| | 2,3,7,8-TCDD | 4.58 | | 2.56 | 0.99 | 6.91 | | 2.67 | 1.75 | 1.59 | 2.61 | 3.64 | 1.27 | 1.35 | 2.08 | 3.23 | 2.77 | | 1.57 | 1.54 |
| | 1,2,3,7,8-PeCDD | 19.30 | | 7.75 | 2.18 | 50.70 | | 11.80 | 13.90 | 5.56 | 16.30 | 11.70 | 10.10 | 5.60 | 7.69 | 15.50 | 9.72 | | 11.60 | 4.68 |
| | 1,2,3,4,7,8-HxCDD | 14.60 | | 7.84 | 2.04 | 28.50 | | 15.80 | 24.90 | 6.19 | 17.80 | 15.20 | 15.00 | 5.59 | 8.75 | 14.70 | 10.10 | | 10.60 | 3.8 |
| | 1,2,3,6,7,8-HxCDD | 88.40 | | 27.00 | 4.70 | 113.00 | | 52.70 | 70.50 | 20.50 | 70.30 | 61.20 | 39.00 | 20.60 | 28.90 | 58.50 | 32.50 | | 35.40 | 8.2 |
| | 1,2,3,7,8,9-HxCDD | 43.50 | | 18.10 | 4.72 | 84.70 | | 30.30 | 61.00 | 15.60 | 41.80 | 36.60 | 32.00 | 14.90 | 21.60 | 39.60 | 22.30 | | 27.50 | 7.78 |
| | 1,2,3,4,6,7,8-HpCDD | 1520.00 | | 524.00 | 72.30 | 1730.00 | | 703.00 | 1550.00 | 472.00 | 1580.00 | 1310.00 | 608.00 | 419.00 | 517.00 | 1220.00 | 625.00 | | 754.00 | 156.00 |
| | OCDD | 15800.00 | | 5380.00 | 1330.00 | 7820.00 | | 4780.00 | 9700.00 | 4300.00 | 14000.00 | 10500.00 | 3570.00 | 3450.00 | 4110.00 | 9950.00 | 5390.00 | | 6940.00 | 3740.00 |
| | 2,3,7,8-TCDF | 210.00 | | 80.70 | 8.05 | 3890.00 | | 408.00 | 47.30 | 15.60 | 201.00 | 129.00 | 42.30 | 13.90 | 31.40 | 65.10 | 31.20 | | 35.90 | 8.67 |
| | 2,3,7,8-TCDF Confirm | 488.00 | | 144.00 | 21.20 | 3590.00 | | 434.00 | 76.10 | 78.00 | 198.00 | 157.00 | 60.80 | 26.10 | 40.30 | 90.30 | 99.70 | | 64.40 | 11.50 |
| | 1,2,3,7,8-PeCDF | 172.00 | | 48.90 | 3.35 | 1850.00 | | 211.00 | 23.30 | 8.19 | 106.00 | 72.60 | 25.10 | 7.71 | 18.50 | 31.70 | 21.80 | | 21.20 | 3.45 |
| | 2,3,4,7,8-PeCDF | 464.00 | | 109.00 | 5.56 | 4990.00 | | 455.00 | 59.20 | 16.20 | 204.00 | 159.00 | 50.40 | 19.20 | 38.40 | 80.60 | 49.40 | | 45.70 | 8.22 |
| | 1,2,3,4,7,8-HxCDF | 1080.00 | | 116.00 | 4.98 | 6750.00 | | 410.00 | 69.50 | 20.70 | 203.00 | 184.00 | 57.70 | 21.20 | 43.50 | 89.50 | 105.00 | | 54.30 | 5.19 |
| | 1,2,3,6,7,8-HxCDF | 307.00 | | 46.70 | 4.80 | 1610.00 | | 158.00 | 39.00 | 13.00 | 89.30 | 68.70 | 24.70 | 10.70 | 21.30 | 41.90 | 35.00 | | 26.10 | 3.77 |
| | 2,3,4,6,7,8-HxCDF | 905.00 | | 101.00 | 7.53 | 4500.00 | | 311.00 | 73.00 | 20.90 | 159.00 | 146.00 | 50.10 | 20.60 | 40.70 | 75.60 | 86.80 | | 49.20 | 9.42 |
| | 1,2,3,7,8,9-HxCDF | 29.20 | | 6.54 | 1.78 | 65.90 | | 9.56 | 6.58 | 2.79 | 8.07 | 8.58 | 9.24 | 3.59 | 5.54 | 14.90 | 5.17 | | 4.43 | 2.42 |
| | 1,2,3,4,6,7,8-HpCDF | 5540.00 | | 639.00 | 49.90 | 16500.00 | | 1240.00 | 544.00 | 192.00 | 827.00 | 766.00 | 283.00 | 144.00 | 233.00 | 504.00 | 598.00 | | 354.00 | 65.30 |
| | 1,2,3,4,7,8,9-HpCDF | 76.80 | | 14.80 | 2.96 | 181.00 | | 28.50 | 29.90 | 11.70 | 27.20 | 28.60 | -9.48 | 7.19 | 11.40 | 22.10 | 18.30 | | 17.60 | 5.6 |
| | OCDF | 4180.00 | | 2200.00 | 173.00 | 4510.00 | | 474.00 | 835.00 | 403.00 | 982.00 | 944.00 | 269.00 | 240.00 | 326.00 | 829.00 | 668.00 | | 797.00 | 255.00 |
| | Sum of Dioxins | 31452 | | 9990 | 2339 | 55339 | | 9386 | 13249 | 6186 | 19535 | 16145 | 5706 | 5025 | 6078 | 14046 | 8369 | | 10186 | 4857 |
| Dioxin CDDs | Total TCDD | 55.80 | | 24.50 | 3.00 | 124.00 | | 11.60 | 22.70 | 9.91 | 21.90 | 25.40 | 1.27 | 5.36 | 4.08 | 28.50 | 24.20 | | 20.60 | 3.86 |
| | Total PeCDD | 59.00 | | 36.10 | 8.19 | 63.30 | | 18.30 | 46.90 | 11.50 | 72.70 | 70.90 | 9.32 | 21.60 | 27.30 | 63.00 | 22.10 | | 52.30 | 8.94 |
| | Total HxCDD | 510.00 | | 244.00 | 59.70 | 988.00 | | 289.00 | 453.00 | 179.00 | 429.00 | 384.00 | 238.00 | 128.00 | 188.00 | 351.00 | 218.00 | | 265.00 | 73.10 |
| | Total HpCDD | 2960.00 | | 1330.00 | 220.00 | 3300.00 | | 1320.00 | 2850.00 | 1200.00 | 3510.00 | 2570.00 | 1250.00 | 783.00 | 967.00 | 2290.00 | 1300.00 | | 1690.00 | 379.00 |
| | Sum of CDDs | 3584.80 | | 1634.60 | 290.89 | 4475.30 | | 1638.90 | 3372.60 | 1400.41 | 4033.60 | 3050.30 | 1498.59 | 937.98 | 1186.38 | 2732.50 | 1562.30 | | 2027.90 | 464.90 |
| Dioxin CDFs | Total TCDF | 1330.00 | | 368.00 | 42.10 | 10900.00 | | 1350.00 | 264.00 | 91.00 | 728.00 | 614.00 | 193.00 | 81.00 | 188.00 | 359.00 | 211.00 | | 200.00 | 48.80 |
| | Total PeCDF | 3450.00 | | 634.00 | 36.30 | 20600.00 | | 2270.00 | 500.00 | 161.00 | 1190.00 | 959.00 | 349.00 | 140.00 | 290.00 | 555.00 | 418.00 | | 365.00 | 53.80 |
| | Total HxCDF | 7180.00 | | 759.00 | 53.60 | 30300.00 | | 2240.00 | 793.00 | 228.00 | 1350.00 | 1200.00 | 443.00 | 197.00 | 347.00 | 717.00 | 755.00 | | 475.00 | 63.90 |
| | Total HpCDF | 7420.00 | | 1170.00 | 87.40 | 18300.00 | | 1770.00 | 1060.00 | 368.00 | 1440.00 | 1380.00 | 461.00 | 290.00 | 456.00 | 975.00 | 1010.00 | | 674.00 | 137.00 |
| | Sum of CDFs | 19380.00 | | 2929.00 | 219.40 | 80100.00 | | 7630.00 | 2617.00 | 844.00 | 4706.00 | 4153.00 | 1446.00 | 708.00 | 1281.00 | 2606.00 | 2392.00 | | 1714.00 | 303.50 |
| | Toxicity Equivalency Factor | 627.65 | | 126.29 | 12.30 | 4505.21 | | 412.21 | 111.86 | 38.99 | 236.28 | 191.44 | 73.55 | 46.98 | | 122.35 | 88.10 | | 76.04 | 18.50 |
| Metals | Silver | 2.00 | | 3.00 | 3.00 | 2.40 | | 1.40 | 1.50 | 1.40 | 1.40 | 0.88 | 0.44 | 0.42 | 0.65 | 0.93 | 0.62 | | 1.60 | 0.60 |
| | Arsenic | 23.90 | | 11.20 | 17.90 | 9.20 | | 7.00 | 10.60 | 6.50 | 9.00 | 9.20 | 3.70 | 3.80 | 4.00 | 8.80 | 8.20 | | 8.10 | 4.50 |
| | Barium | 2710.00 | | 271.00 | 65.70 | 12200.00 | | 1130.00 | 222.00 | 57.80 | 533.00 | 549.00 | 168.00 | 98.70 | 108.00 | 270.00 | 478.00 | | 172.00 | 38.00 |
| | Cadmium | 8.30 | | 1.20 | 1.50 | 1.00 | | 5.50 | 4.40 | 1.40 | 7.60 | 7.60 | 0.80 | 3.20 | 3.20 | 6.30 | 2.60 | | 4.20 | 0.51 |
| | Chromium | 463.00 | | 402.00 | 231.00 | 290.00 | | 89.70 | 99.90 | 84.40 | 91.50 | 116.00 | 31.80 | 35.60 | 39.00 | 91.70 | 97.40 | | 107.00 | 59.20 |
| | Copper | 2550.00 | | 1350.00 | 661.00 | 36400.00 | | 1650.00 | 430.00 | 232.00 | 890.00 | 775.00 | 271.00 | 191.00 | 185.00 | 462.00 | 383.00 | | 361.00 | 173.00 |
| | Mercury | 0.43 | | 0.77 | 1.20 | 0.47 | | 0.22 | 0.32 | 0.37 | 0.28 | 0.49 | 0.18 | 0.14 | 0.17 | 0.28 | 0.28 | | 0.27 | 0.17 |
| | Nickel | 317.00 | | 54.00 | 37.40 | 386.00 | | 80.70 | 49.20 | 37.10 | 59.10 | 86.30 | 20.80 | 20.10 | 25.00 | 52.10 | 63.30 | | 43.40 | 21.00 |
| | Lead | 3290.00 | | 703.00 | 158.00 | 26500.00 | | 1570.00 | 403.00 | 181.00 | 934.00 | 833.00 | 357.00 | 266.00 | 231.00 | 514.00 | 506.00 | | 303.00 | 42.30 |
| | Zinc | 1340.00 | | 399.00 | 292.00 | 2320.00 | | 750.00 | 508.00 | 290.00 | 871.00 | 676.00 | 181.00 | 270.00 | 277.00 | 625.00 | 363.00 | | 439.00 | 171.00 |
| PAHs | 2-Methylnaphthalene | 1000.00 | | 660.00 | 660.00 | 660.00 | | 710.00 | 650.00 | 660.00 | 1000.00 | 1700.00 | 610.00 | 620.00 | 610.00 | 990.00 | 660.00 | | 1000.00 | 570.00 |
| | Acenaphthene | 1000.00 | | 660.00 | 660.00 | 660.00 | | 140.00 | 160.00 | 660.00 | 200.00 | 200.00 | 610.00 | 81.00 | 89.00 | 160.00 | 660.00 | | 1000.00 | 570.00 |
| | Acenaphthylene | 190.00 | | 200.00 | 660.00 | 660.00 | | 350.00 | 330.00 | 130.00 | 410.00 | 440.00 | 140.00 | 160.00 | 170.00 | 340.00 | 110.00 | | 200.00 | 84.00 |
| | Anthracene | 120.00 | | 190.00 | 660.00 | 660.00 | | 520.00 | 520.00 | 140.00 | 680.00 | 640.00 | 250.00 | 280.00 | 330.00 | 570.00 | 150.00 | | 300.00 | 120.00 |
| | Benzo(a)anthracene | 1500.00 | | 560.00 | 190.00 | 660.00 | | 2500.00 | 2700.00 | 670.00 | 4000.00 | 3800.00 | 800.00 | 1400.00 | 1500.00 | 2900.00 | 890.00 | | 1700.00 | 430.00 |
| | Benzo(a)pyrene | 1700.00 | | 660.00 | 230.00 | 120.00 | | 2400.00 | 2200.00 | 840.00 | 4000.00 | 3600.00 | 790.00 | 1300.00 | 1500.00 | 2900.00 | 960.00 | | 1900.00 | 470.00 |
| | Benzo(b)fluoranthene | 2800.00 | | 850.00 | 400.00 | 180.00 | | 4000.00 | 4000.00 | 1000.00 | 10000.00 | 9200.00 | 1200.00 | 1800.00 | 2200.00 | 4500.00 | 1600.00 | | 3400.00 | 900.00 |
| | Benzo(g,h,i)perylene | 260.00 | | 190.00 | 74.00 | 660.00 | | 460.00 | 530.00 | 190.00 | 1100.00 | 1000.00 | 320.00 | 360.00 | 330.00 | 940.00 | 310.00 | | 600.00 | 150.00 |
| | Benzo(k)fluoranthene | 950.00 | | 470.00 | 390.00 | 660.00 | | 1400.00 | 4200.00 | 380.00 | 9100.00 | 8400.00 | 600.00 | 790.00 | 1000.00 | 1800.00 | 870.00 | | 1100.00 | 820.00 |
| | Chrysene | 1400.00 | | 730.00 | 220.00 | 1100.00 | | 3800.00 | 3900.00 | 990.00 | 5300.00 | 4800.00 | 1100.00 | 1900.00 | 2000.00 | 4400.00 | 1200.00 | | 2300.00 | 540.00 |
| | Dibenz(a,h)anthracene | 240.00 | | 660.00 | 660.00 | 660.00 | | 430.00 | 520.00 | 120.00 | 610.00 | 550.00 | 160.00 | 260.00 | 280.00 | 550.00 | 160.00 | | 310.00 | 570.00 |
| | Fluoranthene | 4500.00 | | 1200.00 | 330.00 | 280.00 | | 5600.00 | 4500.00 | 1500.00 | 11000.00 | 11000.00 | 1500.00 | 3000.00 | 3900.00 | 7900.00 | 2400.00 | | 4900.00 | 860.00 |
| | Fluorene | 1000.00 | | 660.00 | 660.00 | 660.00 | | 190.00 | 260.00 | 660.00 | 220.00 | 360.00 | 75.00 | 140.00 | 140.00 | 220.00 | 83.00 | | 130.00 | 570.00 |
| | Indeno(1,2,3-cd)pyrene | 880.00 | | 400.00 | 110.00 | 78.00 | | 1500.00 | 1700.00 | 370.00 | 2200.00 | 2000.00 | 580.00 | 860.00 | 910.00 | 1800.00 | 620.00 | | 1200.00 | 280.00 |
| | Naphthalene | 1000.00 | | 660.00 | 660.00 | 660.00 | | 710.00 | 650.00 | 660.00 | 1000.00 | 1700.00 | 610.00 | 620.00 | 610.00 | 990.00 | 660.00 | | 1000.00 | 570.00 |
| | Phenanthrene | 790.00 | | 390.00 | 120.00 | 150.00 | | 2500.00 | 2200.00 | 610.00 | 2800.00 | 3800.00 | 840.00 | 1500.00 | 1700.00 | 2800.00 | 980.00 | | 1500.00 | 330.00 |
| | Pyrene | 3800.00 | | 1300.00 | 410.00 | 930.00 | | 5900.00 | 5700.00 | 1300.00 | 6900.00 | 5900.00 | 1900.00 | 2700.00 | 2900.00 | 6200.00 | 1400.00 | | 3500.00 | 640.00 |
| | Total PAHs | 23130.00 | | 10440.00 | 7094.00 | 9438.00 | | 33110.00 | 34720.00 | 10680.00 | 60520.00 | 59090.00 | 12085.00 | 17771.00 | 20189.00 | 39960.00 | 13513.00 | | 26040.00 | 8474.00 |

Units: metals = µg/g dry weight, PAHs, PCBs, pesticides, dioxins = ng/g dry weight

Appendix A-1-1 (continued). Results of chemical analyses of sediments collected in the Raymark study area.

| Chemical Class | Analyte | A3SD10 | A3SD10 (B) | CSD1 | GM08 | HB3A | HB3A(B) | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21(A) | SD21(B) | SD23 | SD24 | SD24 (B) | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PCBs | 3 (4) | 1.10 | 1.10 | 0.35 | 0.08 | 4.00 | 2.30 | 1.70 | 0.28 | 0.34 | 0.40 | 0.51 | 0.09 | 0.21 | 0.14 | 0.32 | 0.15 | 0.20 | 0.25 | 0.03 |
| | 8 (2 4')* | | | 0.78 | | | | | 0.98 | 3.00 | 2.90 | | | | | 1.90 | | | 1.00 | |
| | 15 (4 4') | 10.00 | 10.00 | 2.30 | 1.80 | 10.00 | 7.40 | 10.00 | 2.10 | 3.60 | 4.30 | 4.60 | 0.42 | 1.70 | 1.10 | 3.20 | 1.50 | 1.90 | 1.90 | 0.32 |
| | 18 (2 2'5)* | | | 7.50 | | | | | 5.00 | 6.30 | 11.00 | | | | | 6.30 | | | 6.70 | |
| | 28 (2 4 4')* | 34.00 | 34.00 | 13.00 | 5.80 | 26.00 | 21.00 | 37.00 | 7.40 | 9.70 | 16.00 | 16.00 | 1.40 | 4.60 | 3.60 | 10.00 | 4.90 | 4.80 | 8.50 | 1.30 |
| | 44 (2 2'3 5')* | | | 4.70 | | | | | 2.00 | 1.40 | 3.40 | | | | | 2.30 | | | 3.10 | |
| | 52 (2 2'5 5')* | | | 34.00 | | | | | 24.00 | 13.00 | 38.00 | | | | | 30.00 | | | 3.50 | |
| | 66 (2 3'4 4')* | | | 43.00 | | | | | 16.00 | 10.00 | 17.00 | | | | | 11.00 | | | 16.00 | |
| | 77 (3 3' 4 4') | 6.00 | 6.00 | 3.30 | 1.70 | 3.40 | 3.50 | 3.10 | 1.30 | 1.70 | 2.20 | 1.40 | 0.30 | 0.40 | 0.48 | 1.30 | 0.98 | 1.20 | 1.20 | 0.30 |
| | 101 (2 2'4 5 5')* | | | 18.00 | | | | | 22.00 | 13.00 | 37.00 | | | | | 28.00 | | | 23.00 | |
| | 105 (2 3 3'4 4')* | 25.00 | 25.00 | 12.00 | 5.40 | 16.00 | 12.00 | 15.00 | 7.30 | 5.90 | 12.00 | 12.00 | 2.00 | 5.20 | 3.90 | 10.00 | 6.20 | 5.90 | 6.70 | 1.10 |
| | 114 (2 3 4 4'5) | 1.80 | 1.60 | 0.54 | 0.22 | 3.20 | 2.40 | 1.10 | 0.00 | 0.32 | 0.73 | 0.76 | 0.11 | 0.23 | 0.24 | 0.58 | 0.38 | 0.00 | 0.38 | 0.06 |
| | 118 (2 3' 4 4'5)* | 65.00 | 65.00 | 24.00 | 11.00 | 52.00 | 42.00 | 37.00 | 20.00 | 15.00 | 28.00 | 30.00 | 6.20 | 14.00 | 10.00 | 27.00 | 15.00 | 14.00 | 18.00 | 2.80 |
| | 123 (2' 3 4 4'5) | 2.00 | 2.00 | 1.40 | 0.32 | 1.90 | 2.20 | 1.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.33 | 0.05 |
| | 126 (3 3' 4 4' 5) | 3.80 | 3.80 | 1.20 | 0.09 | 46.00 | 20.00 | 2.20 | 0.00 | 0.59 | 3.00 | 1.70 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.96 | 0.08 |
| | 128 (2 2'3 3'4 4')* | | | | | | | | | | | | | | | | | | | |
| | 138 (2 2'3 4 4'5)* | | | 61.00 | | | | | 31.00 | 19.00 | 67.00 | | | | | 45.00 | | | 30.00 | |
| | 153 (2 2'4 4'5 5')* | | | 180.00 | | | | | 68.00 | 28.00 | 250.00 | | | | | 110.00 | | | 66.00 | |
| | 156/157 (2 3 3'4 4'5/2 3 3' 4 4'5') | 13.00 | 13.00 | 4.60 | 1.40 | 32.00 | 25.00 | 7.20 | 3.10 | 2.20 | 5.60 | 5.40 | 1.40 | 2.30 | 1.70 | 4.80 | 2.90 | 3.20 | 2.20 | 0.4 |
| | 167 (2 3'4 4' 5 5') | 13.00 | 13.00 | 4.00 | 0.48 | 88.00 | 72.00 | 11.00 | 1.80 | 1.20 | 5.30 | 3.70 | 1.00 | 1.10 | 0.94 | 2.80 | 2.60 | 2.20 | 1.50 | 0.19 |
| | 169 (3 3'4 4'5 5') | 20.00 | 20.00 | 4.60 | 0.00 | 190.00 | 180.00 | 110.00 | 12.00 | 4.30 | 50.00 | 25.00 | 1.10 | 5.60 | 7.80 | 20.00 | 32.00 | 29.00 | 1.50 | 0.03 |
| | 170 (2 2'3 3'4 4'5)* | 130.00 | 130.00 | 44.00 | 1.80 | 4200.00 | 3000.00 | 170.00 | 18.00 | 7.20 | 67.00 | 37.00 | 14.00 | 8.80 | 8.50 | 31.00 | 26.00 | 27.00 | 17.00 | 1.50 |
| | 180 (2 2'3 4 4'5 5')* | 2800.00 | 3200.00 | 780.00 | 6.20 | 52000.00 | 42000.00 | 2600.00 | 270.00 | 89.00 | 1100.00 | 540.00 | 280.00 | 140.00 | 160.00 | 490.00 | 580.00 | 590.00 | 250.00 | 7.80 |
| | 187 (2 2'3 4'5 5'6)* | | | 930.00 | | | | | 340.00 | 110.00 | 1400.00 | | | | | 590.00 | | | 360.00 | |
| | 189 (2 3 3'4 4'5 5') | 15.00 | 15.00 | 4.40 | 0.00 | 120.00 | 92.00 | 11.00 | 0.00 | 0.00 | 4.90 | 2.50 | 1.10 | 0.00 | 0.00 | 1.90 | 0.00 | 2.60 | 0.00 | 0.00 |
| | 195 (2 2'3 3'4 4'5 6)* | | | 78.00 | | | | | 26.00 | 9.30 | 110.00 | | | | | 55.00 | | | 21.00 | |
| | 206 (2 2'3 3'4 4'5 5'6)* | | | 680.00 | | | | | 300.00 | 150.00 | 1100.00 | | | | | 600.00 | | | 280.00 | |
| | 209 (2 2'3 3'4 4'5 5'6 6')* | 500.00 | 500.00 | 63.00 | 1.30 | 2100.00 | 1900.00 | 210.00 | 32.00 | 18.00 | 100.00 | 63.00 | 34.00 | 17.00 | 18.00 | 60.00 | 110.00 | 110.00 | 33.00 | 0.86 |
| | Sum of PCB Congeners | | | 2941 | | | | | 1190 | 508 | 4359 | | | | | 2108 | | | 1142 | |
| | Total PCBs (Sum of Congeners X 2) | 27081 | 27081 | 6006 | 247 | 353763 | 280604 | 20718 | 2355 | 967 | 8661 | 4642 | 2428 | 1217 | 1319 | 4119 | 4886 | 4845 | 2383 | 105 |
| PCB Homologs | Total MonoCBs | 2.00 | 2.00 | 0.35 | 0.12 | 15.0 | 8.50 | 6.10 | 0.81 | 0.34 | 1.20 | 1.30 | 0.24 | 0.44 | 0.17 | 1.00 | 0.78 | 0.64 | 0.47 | 0.09 |
| | Total DiCBs | 24.0 | 24.0 | 6.20 | 2.60 | 40.0 | 26.0 | 35.0 | 8.20 | 11.0 | 11.0 | 16.0 | 1.40 | 8.30 | 3.40 | 8.50 | 12.0 | 3.70 | 9.10 | 0.92 |
| | Total TriCBs | 180 | 180 | 53.0 | 20.0 | 140 | 120 | 200 | 53.0 | 50.0 | 100 | 99.0 | 8.20 | 37.0 | 27.0 | 68.0 | 33.0 | 32.0 | 51.0 | 6.00 |
| | Total TetraCBs | 600 | 600 | 300 | 110 | 440 | 460 | 250 | 100 | 73.0 | 180 | 150 | 28.0 | 81.0 | 48.0 | 130 | 75.0 | 70.0 | 160 | 22.0 |
| | Total PentaCBs | 740 | 740 | 180 | 66.0 | 1900 | 1400 | 340 | 150 | 97.0 | 240 | 140 | 52.0 | 96.0 | 65.0 | 200 | 130 | 120 | 150 | 19.0 |
| | Total HexaCBs | 1900 | 1900 | 600 | 42.0 | 38000 | 27000 | 1900 | 230 | 100 | 790 | 460 | 200 | 130 | 120 | 390 | 370 | 350 | 230 | 25.0 |
| | Total HeptaCBs | 13000 | 13000 | 3000 | 28.0 | 230000 | 180000 | 11000 | 1100 | 330 | 4400 | 2200 | 1300 | 490 | 580 | 1900 | 2100 | 2100 | 1100 | 34.0 |
| | Total OctaCBs | 6300 | 6300 | 1300 | 5.40 | 71000 | 58000 | 4800 | 460 | 180 | 1900 | 1000 | 580 | 250 | 300 | 870 | 1200 | 1200 | 480 | 9.40 |
| | Total NonaCBs | 6700 | 6700 | 1100 | 4.60 | 43000 | 38000 | 4000 | 470 | 220 | 1800 | 990 | 480 | 260 | 300 | 920 | 1400 | 1400 | 420 | 7.60 |
| | Sum of PCB Homologs | 29448 | 29448 | 6539 | 279 | 384535 | 305015 | 22530 | 2570 | 1061 | 9424 | 5058 | 2650 | 1333 | 1444 | 4488 | 5321 | 5276 | 2601 | 124 |
| | Total PCBs | 30000 | 30000 | 6600 | 280 | 390000 | 310000 | 23000 | 2600 | 1100 | 9500 | 5100 | 2700 | 1300 | 1500 | 4500 | 5400 | 5400 | 2600 | 120 |
| PCB Aroclors | Aroclor 1016 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1221 | | | | | 130.00 | | | 130.00 | | | | | 110.00 | | | | | | |
| | Aroclor 1232 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1242 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1248 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1254 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1260 | | | | | 66.00 | | | 65.00 | | | | | 54.00 | | | | | | |
| | Aroclor 1262 | | | | | 24000.00 | | | 680.00 | | | | | 320.00 | | | | | | |
| | Aroclor 1268 | | | | | 15000.00 | | | 560.00 | | | | | 200.00 | | | | | | |
| | Sum of Aroclors | | | | | 39526.00 | | | 1760.00 | | | | | 954.00 | | | | | | |
| Pesticides | 4 4' DDD | | | | | 11.00 | | | 9.50 | | | | | 5.40 | | | | | | |
| | 4 4' DDT | | | | | 6.60 | | | 6.50 | | | | | 5.40 | | | | | | |
| | Aldrin | | | | | 3.40 | | | 3.40 | | | | | 0.97 | | | | | | |
| | Alpha chlordane | | | | | 3.40 | | | 18.00 | | | | | 5.70 | | | | | | |
| | Alpha BHC | | | | | 3.40 | | | 3.40 | | | | | 2.80 | | | | | | |
| | Beta BHC | | | | | 3.40 | | | 3.40 | | | | | 2.80 | | | | | | |
| | Delta BHC | | | | | 3.40 | | | 1.20 | | | | | 0.61 | | | | | | |
| | Dieldrin | | | | | 0.91 | | | 6.50 | | | | | 5.40 | | | | | | |

Units: metals = µg/g dry weight, PAHs, PCBs, pesticides, dioxins = ng/g dry weight

* indicates congeners included in Sum of PCB Congeners and Total PCBs (Sum of Congeners X 2) calculation

Additional Total PCBs (Sum of Congeners X 2) values calculated from regression analysis as 0.920*(Sum of PCB Homologs) - 9.548

Appendix A-1-1 (continued). Results of chemical analyses of sediments collected in the Raymark study area.

| Chemical Class | Analyte | A3SD10 | A3SD10 (B) | CSD1 | GM08 | HB3A | HB3A(B) | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21(A) | SD21(B) | SD23 | SD24 | SD24 (B) | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pesticides continued | Endosulfan I | | | | | 3 40 | | | 0 66 | | | | | 0 45 | | | | | | |
| | Endosulfan II | | | | | 6 60 | | | 1 60 | | | | | 0 92 | | | | | | |
| | Endosulfan sulfate | | | | | 120 00 | | | 6 50 | | | | | 5 40 | | | | | | |
| | Endrin | | | | | 6 60 | | | 6 50 | | | | | 5 40 | | | | | | |
| | Endrin aldehyde | | | | | 2300 00 | | | 20 00 | | | | | 20 00 | | | | | | |
| | Endrin ketone | | | | | 6 60 | | | 6 50 | | | | | 5 40 | | | | | | |
| | Gamma chlordane | | | | | 5 30 | | | 6 10 | | | | | 4 90 | | | | | | |
| | Gamma BHC (Lindane) | | | | | 3 40 | | | 3 40 | | | | | 2 80 | | | | | | |
| | Heptachlor | | | | | 3 40 | | | 3 40 | | | | | 2 80 | | | | | | |
| | Heptachlor epoxide | | | | | 3 40 | | | 3 40 | | | | | 2 80 | | | | | | |
| | Hexachlorobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Toxaphene | | | | | 340 00 | | | 340 00 | | | | | 280 00 | | | | | | |
| | p,p'-DDE | | | | | 3 60 | | | 7 20 | | | | | 5 40 | | | | | | |
| | p,p' Methoxychlor | | | | | 34 00 | | | 34 00 | | | | | 28 00 | | | | | | |
| VOAs | 1,2,4 Trichlorobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 1,2 Dichlorobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 1,3 Dichlorobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 1,4 Dichlorobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,2'-Oxybis(1-chloropropane) | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,4,5 Trichlorophenol | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 2,4,6 Trichlorophenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,4 Dichlorophenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,4 Dimethylphenol | 1000 00 | | 660 00 | 660 00 | 230 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,4 Dinitrophenol | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 2,4 Dinitrotoluene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2,6 Dinitrotoluene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2 Chloronaphthalene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2 Chlorophenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2 Methylphenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 2 Nitroaniline | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 2 Nitrophenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 3,3' Dichlorobenzidine | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 3 Nitroaniline | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 4,6-Dinitro-2-methylphenol | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 4 Bromophenyl phenyl ether | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 4 Chloro-3 methylphenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 4 Chloroaniline | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 4 Chlorophenyl phenyl ether | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 4 Methylphenol | 1000 00 | | 660 00 | 660 00 | 660 00 | | 1300 00 | 67 00 | 660 00 | 1000 00 | 1700 00 | 9900 00 | 430 00 | 470 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | 4 Nitroaniline | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | 4 Nitrophenol | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | Butyl benzyl phthalate | 1000 00 | | 660 00 | 660 00 | 660 00 | | 540 00 | 1700 00 | 660 00 | 810 00 | 470 00 | 250 00 | 110 00 | 91 00 | 670 00 | 210 00 | | 280 00 | 570 00 |
| | Carbazole | 110 00 | | 660 00 | 660 00 | 660 00 | | 410 00 | 390 00 | 83 00 | 430 00 | 550 00 | 140 00 | 230 00 | 230 00 | 410 00 | 130 00 | | 220 00 | 570 00 |
| | Di-n-butyl phthalate | 1000 00 | | 660 00 | 660 00 | 660 00 | | 84 00 | 650 00 | 660 00 | 170 00 | 1700 00 | 610 00 | 95 00 | 110 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Di-n-octyl phthalate | 1000 00 | | 660 00 | 660 00 | 660 00 | | 2200 00 | 2000 00 | 87 00 | 3300 00 | 3300 00 | 120 00 | 660 00 | 1000 00 | 2400 00 | 180 00 | | 740 00 | 570 00 |
| | Dibenzofuran | 1000 00 | | 660 00 | 660 00 | 660 00 | | 89 00 | 100 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Diethyl phthalate | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Dimethyl phthalate | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 220 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Hexachlorobutadiene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Hexachlorocyclopentadiene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Hexachloroethane | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Isophorone | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | N Nitroso-di-n-propylamine | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | N Nitrosodiphenylamine(1) | 1000 00 | | 110 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Nitrobenzene | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | Pentachlorophenol | 2500 00 | | 1700 00 | 1700 00 | 1700 00 | | 1800 00 | 1600 00 | 1700 00 | 2600 00 | 4400 00 | 1500 00 | 1600 00 | 1500 00 | 2500 00 | 1700 00 | | 2500 00 | 1400 00 |
| | Phenol | 1000 00 | | 660 00 | 660 00 | 120 00 | | 240 00 | 110 00 | 660 00 | 180 00 | 240 00 | 1000 00 | 620 00 | 610 00 | 170 00 | 660 00 | | 1000 00 | 570 00 |
| | bis(2-Chloroethoxy)methane | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | bis(2 Chloroethyl)ether | 1000 00 | | 660 00 | 660 00 | 660 00 | | 710 00 | 650 00 | 660 00 | 1000 00 | 1700 00 | 610 00 | 620 00 | 610 00 | 990 00 | 660 00 | | 1000 00 | 570 00 |
| | bis(2 Ethylhexyl)phthalate | 1400 00 | | 230 00 | 140 00 | 130 00 | | 6000 00 | 6200 00 | 420 00 | 9700 00 | 15000 00 | 2000 00 | 3500 00 | 3900 00 | 5800 00 | 1500 00 | | 4300 00 | 320 00 |

Units metals = µg/g dry weight, PAHs, PCBs, pesticides, dioxins = ng/g dry weight

Appendix A-1-2.1. Results of chemical analyses of sediment porewaters collected from the Raymark study area.

| Chemical Class | Analyte | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21(A) | SD21(B) | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Aluminum | 250.00 | 0.00 | 1670.00 | 1380.00 | 250.00 | 0.00 | 210.00 | 0.00 | 0.00 | 0.00 | 0.00 | 330.00 | 0.00 | 290 | 230.00 | 0.00 |
| | Silver | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Arsenic | 19.90 | 58.70 | 20.10 | 33.50 | 0.00 | 95.20 | 80.80 | 73.60 | 17.50 | 7.80 | 15.70 | 8.20 | 34.60 | 11.80 | 19.10 | 18.00 |
| | Barium | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Cadmium | 5.60 | 3.68 | 0.17 | 3.17 | 2.83 | 3.86 | 1.60 | 2.78 | 3.27 | 0.65 | 3.45 | 3.36 | 3.33 | 2.80 | 3.71 | 2.95 |
| | Chromium | 1.47 | 2.64 | 1.69 | 0.84 | 3.24 | 1.05 | 0.00 | 2.81 | 3.14 | 1.88 | 1.33 | 0.00 | 3.24 | 2.36 | 0.00 | 0.00 |
| | Copper | 65.00 | 71.00 | 55.00 | 599.00 | 112.00 | 54.00 | 32.00 | 46.00 | 48.00 | 0.00 | 52.00 | 49.00 | 35.00 | 41.00 | 55.00 | 54.00 |
| | Iron | 170.00 | 520.00 | 470.00 | 340.00 | 610.00 | 170.00 | 310.00 | 220.00 | 250.00 | 12540.00 | 280.00 | 310.00 | 120.00 | 3700.00 | 120.00 | 200.00 |
| | Nickel | 243.80 | 14.20 | 32.00 | 111.80 | 27.30 | 15.30 | 41.00 | 4.00 | 31.00 | 12.70 | 16.40 | 13.60 | 9.50 | 14.90 | 7.40 | 0.00 |
| | Lead | 1.40 | 1.44 | 1.56 | 13.24 | 2.80 | 0.75 | 1.72 | 0.75 | 3.56 | 1.00 | 1.96 | 2.56 | 3.92 | 4.40 | 2.76 | 8.96 |
| | Zinc | 1540.00 | 260.00 | 420.00 | 170.00 | 170.00 | 150.00 | 200.00 | 140.00 | 270.00 | 40.00 | 130.00 | 100.00 | 60.00 | 50.00 | 260.00 | 50.00 |
| PAHs | 1-Methylnaphthalene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1-Methylphenanthrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2,3,5-Trimethylnaphthalene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2,6-Dimethylnaphthalene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 2-Methylnaphthalene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Acenaphthene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Acenaphthylene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Anthracene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(a)anthracene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(a)pyrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(b)fluoranthene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(e)pyrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(g,h,i)perylene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(k)fluoranthene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Biphenyl | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Chrysene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Dibenz(a,h)anthracene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Fluoranthene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Fluorene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Indeno(1,2,3-cd)pyrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Naphthalene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Perylene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Phenanthrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pyrene | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sum of PAHs | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PCBs | 8 (2 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 877.10 | 748.80 | 212.70 | 0.00 | 0.00 | 0.00 | 0.00 | 471.90 | 0.00 | 607.30 | 0.00 |
| | 18 (2 2'5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 85.10 | 189.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 64.40 | 0.00 | 163.40 | 0.00 |
| | 28 (2 4 4')* | 0.00 | 29.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 55.80 | 0.00 |
| | 44 (2 2'3 5')* | 0.00 | 195.60 | 0.00 | 0.00 | 0.00 | 24.00 | 17.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 125.70 | 0.00 |
| | 52 (2 2'5 5')* | 0.00 | 321.30 | 0.00 | 0.00 | 0.00 | 55.80 | 44.90 | 11.70 | 0.00 | 0.00 | 0.00 | 0.00 | 35.90 | 0.00 | 145.40 | 0.00 |
| | 66 (2 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 23.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 77(3 3' 4 4') | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.40 | 0.00 |
| | 101 (2 2'4 5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.50 | 0.00 |
| | 105 (2 3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 118 (2 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 126 (3 3' 4 4' 5) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 128 (2 2'3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 138 (2 2'3 4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 153 (2 2'4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 170 (2 2'3 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 180 (2 2'3 4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 187 (2 2'3 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 195 (2 2'3 3'4 4'5 6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 206 (2 2'3 3'4 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 209 (2 2'3 3'4 4'5 5'6 6')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total PCBs (Sum of Congeners X 2) | 0.00 | 1093.00 | 0.00 | 0.00 | 0.00 | 2084.00 | 2000.20 | 503.60 | 0.00 | 0.00 | 0.00 | 0.00 | 1144.40 | 0.00 | 2212.20 | 0.00 |

Units: µg/L. * indicates congeners included in Total PCBs calculation.

Appendix A-1-2.2. Results of chemical analyses of EDTA-treated sediment porewaters collected from the Raymark study area.

| Chemical Class | Analyte | CSD1 | SD07 | SD08 | SD13 | SD23 | SD28 |
|---|---|---|---|---|---|---|---|
| PCBs | 8 (2 4')* | 0.00 | 0.00 | 0.00 | 143.19 | 126.15 | 0.00 |
| | 18 (2 2'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 28 (2 4 4')* | 0.00 | 0.00 | 8.30 | 0.00 | 0.00 | 0.00 |
| | 44 (2 2'3 5')* | 0.00 | 0.00 | 4.62 | 0.00 | 0.00 | 0.00 |
| | 52 (2 2'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 66 (2 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 77(3 3' 4 4') | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 101 (2 2'4 5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 105 (2 3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 118 (2 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 126 (3 3' 4 4' 5) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 128 (2 2'3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 138 (2 2'3 4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 153 (2 2'4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 170 (2 2'3 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 180 (2 2'3 4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 187 (2 2'3 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 195 (2 2'3 3'4 4'5 6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 206 (2 2'3 3'4 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 6.50 | 0.00 | 0.00 |
| | 209 (2 2'3 3'4 4'5 5'6 6')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total PCBs (Sum of Congeners X 2) | 0.00 | 0.00 | 25.84 | 299.38 | 252.30 | 0.00 |

Units: µg/L. * indicates congeners included in Total PCBs calculation

Appendix A-1-2.3. Results of chemical analyses of C18-treated sediment porewaters collected from the Raymark study area.

| Chemical Class | Analyte | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21(A) | SD21(B) | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Arsenic | 0.84 | 40.98 | 2.00 | 1.24 | 0.00 | 63.54 | 57.98 | 5.28 | 0.00 | 2.24 | 1.14 | 1.46 | 10.12 | 0.00 | 52.86 | 5.54 |
| | Cadmium | 9.32 | 8.48 | 6.62 | 5.16 | 3.39 | 5.48 | 5.76 | 3.75 | 4.52 | 1.01 | 3.13 | 5.66 | 4.85 | 3.74 | 9.42 | 5.78 |
| | Chromium | 0.00 | 0.38 | 0.00 | 0.00 | 1.44 | 0.00 | 0.00 | 0.00 | 1.03 | 0.51 | 0.00 | 0.00 | 0.94 | 0.36 | 0.00 | 0.21 |
| | Copper | 23.00 | 19.00 | 28.00 | 84.00 | 15.00 | 30.00 | 19.00 | 21.00 | 18.00 | 0.00 | 13.00 | 9.00 | 28.00 | 18.00 | 26.00 | 31.00 |
| | Nickel | 6.58 | 0.00 | 0.00 | 0.00 | 12.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Lead | 0.00 | 0.00 | 0.00 | 3.30 | 0.00 | 0.00 | 0.00 | 0.00 | 4.38 | 0.00 | 0.00 | 4.96 | 4.18 | 0.00 | 0.00 | 0.00 |
| | Zinc | 2400.00 | 100.00 | 510.00 | 230.00 | 170.00 | 70.00 | 90.00 | 120.00 | 140.00 | 70.00 | 80.00 | 70.00 | 40.00 | 50.00 | 70.00 | 60.00 |

Units: µg/L

Appendix A-1-2.4. Results of chemical analyses of *Ulva* and non-*Ulva* sediment porewaters collected from the Raymark study area.

| Chemical Class | Analyte | *Ulva* | | | | Non-*Ulva* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | A3SD10 | HB3A | SD01 | SD28 | A3SD10 | HB3A | SD01 | SD28 |
| Metals | Arsenic | 18.56 | 20.15 | 0.89 | 8.05 | 23.69 | 25.47 | 2.64 | 14.86 |
| | Cadmium | 4.58 | 2.12 | 2.48 | 2.86 | 5.01 | 2.87 | 3.14 | 2.57 |
| | Chromium | na | na | na | na | na | na | na | na |
| | Copper | 70.00 | 371.00 | 40.00 | 64.00 | 41.00 | 628.00 | 28.00 | 53.00 |
| | Nickel | na | na | na | na | na | na | na | na |
| | Lead | na | na | na | na | na | na | na | na |
| | Zinc | 120.00 | 530.00 | 70.00 | 50.00 | 80.00 | 910.00 | 80.00 | 100.00 |
| PCBs | 8 (2 4)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 18 (2 2'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 28 (2 4 4')* | 0.00 | 0.00 | 10.49 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 44 (2 2'3 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.21 | 0.00 |
| | 52 (2 2'5 5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 66 (2 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 77(3 3' 4 4') | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 99 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 101 (2 2'4 5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 105 (2 3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 118 (2 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 126 (3 3' 4 4' 5) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 128 (2 2'3 3'4 4')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 138 (2 2'3 4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 153 (2 2'4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 170 (2 2'3 3'4 4'5)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 180 (2 2'3 4 4'5 5')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 187 (2 2'3 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 195 (2 2'3 3'4 4'5 6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 206 (2 2'3 3'4 4'5 5'6)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 209 (2 2'3 3'4 4'5 5'6 6')* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total PCBs (Sum of Congeners X 2) | 0.00 | 0.00 | 20.98 | 0.00 | 0.00 | 0.00 | 6.43 | 0.00 |

Units: µg/L. na=not applicable. * indicates congeners included in Total PCBs calculation.

Appendix A 3. Results o. :mical analyses of ussues collect. from fish in the Raymark stuc, area.

| Chemical Class | Analyte | A3SD10 | GM08 | MF03 | SD26 |
|---|---|---|---|---|---|
| Dioxins | 2,3,7,8-TCDD | 0.20 | 0.33 | 0.27 | 0.22 |
| | 1,2,3,7,8-PeCDD | 0.33 | 0.82 | 0.49 | 0.32 |
| | 1,2,3,4,7,8-HxCDD | 0.09 | 0.16 | 0.12 | 0.12 |
| | 1,2,3,6,7,8-HxCDD | 0.25 | 0.41 | 0.31 | 0.33 |
| | 1,2,3,7,8,9-HxCDD | 0.11 | 0.14 | 0.13 | 0.18 |
| | 1,2,3,4,6,7,8-HpCDD | 2.27 | 1.39 | 2.48 | 7.14 |
| | OCDD | 1[illegible].80 | 10.90 | 17.40 | 42.00 |
| | 2,3,7,8-TCDF | 1.38 | 3.19 | 1.22 | 1.69 |
| | 2,3,7,8-TCDF Confirm. | 2.02 | 4.18 | 1.56 | 2.30 |
| | 1,2,3,7,8-PeCDF | 0.43 | 0.35 | 0.15 | 0.15 |
| | 2,3,4,7,8-PeCDF | 1.24 | 1.09 | 0.50 | 0.69 |
| | 1,2,3,4,7,8-HxCDF | 0.51 | 0.16 | 0.16 | 0.30 |
| | 1,2,3,6,7,8-HxCDF | 0.35 | 0.14 | 0.09 | 0.12 |
| | 1,2,3,7,8,9-HxCDF | 0.70 | 0.42 | 0.35 | 0.47 |
| | 2,3,4,6,7,8-HxCDF | 0.09 | 0.11 | 0.06 | 0.12 |
| | 1,2,3,4,6,7,8-HpCDF | 2.07 | 1.63 | 3.24 | 2.36 |
| | 1,2,3,4,7,8,9-HpCDF | 0.15 | 0.30 | 0.21 | 0.27 |
| | OCDF | 8.61 | 7.77 | 17.80 | 10.30 |
| | Sum of Dioxins | 36.57 | 29.30 | 44.98 | 66.77 |
| Dioxin CDDs | Total TCDD | 0.20 | 0.33 | 0.45 | 0.28 |
| | Total PeCDD | 0.33 | 0.01 | 0.49 | 0.32 |
| | Total HxCDD | 0.62 | 0.26 | 0.88 | 1.41 |
| | Total HpCDD | 3.55 | 2.69 | 4.31 | 15.50 |
| | Sum of CDDs | 4.69 | 3.29 | 6.13 | 17.51 |
| Dioxin CDFs | Total TCDF | 3.40 | 3.27 | 1.53 | 3.36 |
| | Total PeCDF | 4.44 | 2.71 | 0.95 | 1.71 |
| | Total HxCDF | 3.57 | 1.30 | 1.83 | 0.99 |
| | Total HpCDF | 3.83 | 6.67 | 13.90 | 8.12 |
| | Sum of CDFs | 15.24 | 13.95 | 18.21 | 14.18 |
| | Toxicity Equivalency Factor | 1.42 | 1.82 | 1.11 | 1.21 |
| PCBs | 3 (4) | 0.00 | 0.00 | 0.00 | 0.00 |
| | 15 (4 4') | 0.00 | 0.00 | 0.00 | 0.00 |
| | 28 (2 4 4') | 2.50 | 13.00 | 3.30 | 3.40 |
| | 77 (3 3' 4 4') | 0.00 | 1.30 | 0.00 | 0.00 |
| | 105 (2 3 3'4 4') | 3.20 | 14.00 | 3.70 | 4.30 |
| | 114 (2 3 4 4'5) | 0.18 | 0.62 | 0.30 | 0.31 |
| | 118 (2 3' 4 4'5) | 11.00 | 36.00 | 12.00 | 14.00 |
| | 123 (2' 3 4 4'5) | 0.00 | 0.38 | 0.00 | 0.00 |
| | 126 (3 3' 4 4' 5) | 0.00 | 0.00 | 0.00 | 0.00 |
| | 156/157 (2 3 3'4 4'5/2 3 3' 4 4'5') | 0.85 | 2.70 | 1.30 | 1.10 |
| | 167 (2 3'4 4' 5 5') | 0.80 | 1.80 | 0.69 | 0.77 |
| | 169 (3 3'4 4'5 5') | 0.37 | 0.00 | 0.22 | 0.00 |
| | 170 (2 2'3 3'4 4'5) | 3.30 | 2.90 | 2.40 | 3.70 |
| | 180 (2 2'3 4 4'5 5') | 58.00 | 11.00 | 39.00 | 40.00 |
| | 189 (2 3 3'4 4'5 5') | 0.00 | 0.00 | 0.00 | 0.00 |
| | 209 (2 2'3 3'4 4'5 5'6 6') | 2.20 | 0.37 | 1.80 | 1.50 |
| | Sum of PCB Congeners | 82.40 | 84.07 | 64.71 | 69.08 |
| | Sum of PCB Congeners X 2 | 164.80 | 168.14 | 129.42 | 138.16 |
| PCB Homologs | Total MonoCBs | 0.13 | 0.00 | 0.00 | 0.00 |
| | Total DiCBs | 0.62 | 0.42 | 1.60 | 0.00 |
| | Total TriCBs | 18.00 | 31.00 | 47.00 | 14.00 |
| | Total TetraCBs | 68.00 | 180.00 | 120.00 | 94.00 |
| | Total PentaCBs | 77.00 | 170.00 | 88.00 | 89.00 |
| | Total HexaCBs | 77.00 | 120.00 | 64.00 | 85.00 |
| | Total HeptaCBs | 200.00 | 43.00 | 130.00 | 130.00 |
| | Total OctaCBs | 62.00 | 5.00 | 74.00 | 64.00 |
| | Total NonaCBs | 40.00 | 0.00 | 25.00 | 24.00 |
| | Sum of PCB Homologs | 542.75 | 549.42 | 549.60 | 500.00 |
| | Total PCBs | 540.00 | 550.00 | 550.00 | 500.00 |
| Tissue Lipid Content (%) | | 2.10 | 3.60 | 1.60 | 1.70 |

Units: PCBs, dioxins = ng/g dry weight.

Appendix A-1-4.1. Grain size analysis for sediments collected from the Raymark study area.

| Sample ID | % Sand | % Silt | % Clay | %Silt 63-15.6u | %Silt <15.6u |
|---|---|---|---|---|---|
| A3SD10 | 35.6 | 64.4 | 0.00 | 24.3 | 40.1 |
| CSD1 | 84.9 | 15.1 | 0.00 | 3.50 | 11.6 |
| GM03 | 78.3 | 21.7 | 0.00 | 8.18 | 13.5 |
| HB3A | 20.5 | 78.1 | 1.38 | 29.1 | 50.4 |
| SD01 | 33.0 | 65.6 | 1.39 | 20.1 | 46.9 |
| SD07 | 73.3 | 25.9 | 0.75 | 9.51 | 17.2 |
| SD08 | 66.6 | 33.4 | 0.00 | 17.2 | 16.2 |
| SD13 | 54.7 | 44.0 | 1.30 | 11.3 | 34.0 |
| SD13-RP[1] | 54.7 | 45.3 | 0.00 | 15.6 | 29.8 |
| SD14 | 57.0 | 42.0 | 0.96 | 14.3 | 28.7 |
| SD14-RP[1] | 57.0 | 42.2 | 0.76 | 16.5 | 26.4 |
| SD18 | 16.7 | 83.3 | 0.00 | 27.6 | 55.7 |
| SD21(A) | 22.3 | 75.5 | 2.14 | 31.0 | 46.7 |
| SD21(B)[2] | 20.7 | 75.2 | 4.10 | 30.1 | 49.2 |
| SD23 | 52.0 | 46.9 | 1.07 | 18.2 | 29.8 |
| SD24 | 57.1 | 36.5 | 6.42 | 20.8 | 22.1 |
| SD28 | 78.5 | 15.7 | 5.90 | 6.49 | 15.1 |
| SD37 | 28.4 | 71.6 | 0.00 | 22.5 | 49.1 |

1 - Lab duplicate.
2 - Field duplicate.

Appendix A-1-4.2. Analysis for Organic Carbon in sediments and sediment porewaters collected from the Raymark study area.

| | Sediment | Porewater |
|---|---|---|
| Sample ID | Total Organic Carbon (%) | Dissolved Organic Carbon (mg/L) |
| A3SD10 | 8.76 | 10.3 |
| A3SD10-DUP[1] | | 9.90 |
| CSD1 | 12.1 | 21.3 |
| GM03 | 5.86 | 14.3 |
| HB3A | 14.9 | 30.4 |
| SD01 | 7.07 | 69.0 |
| SD07 | 7.77 | 24.1 |
| SD08 | 10.0 | 24.6 |
| SD13 | 10.7 | 33.6 |
| SD14 | 7.86 | 51.1 |
| SD18 | 6.36 | 459 |
| SD21(A) | 4.56 | 81.9 |
| SD21(B)[2] | 3.25 | 88.7 |
| SD21-AVG | 3.91 | 85.3 |
| SD23 | 8.78 | 30.7 |
| SD24 | 9.91 | 25.0 |
| SD28 | 6.26 | 19.7 |
| SD37 | 2.03 | 34.2 |
| Median | 7.77 | 30.6 |

1 - Lab duplicate.

2 - Field duplicate.

Note: mg/g dry weight = % X 10

Appendix A-1-5. Summary of SEM and AVS concentrations in sediments collected from the Raymark study area.

| Sample Name | AVS (µmol/g dry) | SEM Concentration (µmol/g dry) Cd | Cu | Ni | Pb | Zn | Sum of SEM Conc | SEM-AVS (µmol/g dry) |
|---|---|---|---|---|---|---|---|---|
| A3SD10 | 2.07 | 0.02 | 0.04 | 0.58 | 5.18 | 6.74 | 12.6 | **10.5** |
| CSD1 | 31.6 | 7.3E-3 | 0.28 | 0.37 | 2.48 | 2.89 | 6.03 | -25.5 |
| GM08 | 9.40 | 1.1E-2 | 0.32 | 0.15 | 0.41 | 3.64 | 4.53 | -4.9 |
| HB3A | 54.7 | 3.9E-3 | 0.03 | 0.78 | 46.1 | 15.3 | 62.2 | **7.5** |
| SD01 | 77.7 | 0.03 | 1.2E-2 | 0.46 | 6.51 | 7.93 | 14.9 | -62.7 |
| SD07 | 117 | 0.02 | 0.08 | 0.37 | 1.49 | 5.49 | 7.44 | -109.2 |
| SD07-RP[1] | 128 | 0.02 | 0.05 | 0.36 | 1.38 | 5.23 | 7.04 | -121.3 |
| SD08 | 85.2 | 1.4E-2 | 0.21 | 0.46 | 0.71 | 3.82 | 5.23 | -79.9 |
| SD13 | 90.5 | 0.04 | 0.03 | 0.32 | 3.62 | 7.65 | 11.7 | -78.9 |
| SD14 | 63.5 | 0.05 | 2.4E-3 | 0.43 | 1.63 | 5.56 | 7.67 | -55.8 |
| SD18 | 0.68 | 6.7E-3 | 2.66 | 0.20 | 1.60 | 2.46 | 6.94 | **6.3** |
| SD18-RP[1] | 0.76 | 7.1E-3 | 2.63 | 0.20 | 1.70 | 2.58 | 7.11 | **6.3** |
| SD21A | 90.8 | 0.02 | 0.06 | 0.28 | 1.19 | 3.75 | 5.29 | -85.5 |
| SD21B | 99.3 | 0.02 | 0.02 | 0.24 | 1.20 | 3.89 | 5.36 | -94.0 |
| SD23 | 164 | 0.03 | 0.20 | 0.66 | 2.27 | 6.08 | 9.24 | -154.7 |
| SD24 | 109 | 0.02 | 0.47 | 0.72 | 2.13 | 5.40 | 8.74 | -100.3 |
| SD28 | 105 | 0.02 | 0.21 | 0.29 | 1.23 | 7.43 | 9.19 | -95.3 |
| SD37 | 10.1 | 3.1E-3 | 0.48 | 0.12 | 0.14 | 1.65 | 2.39 | -7.7 |

1 - RP designates replicate analysis.

SEM = Simultaneously Extractable Metals; AVS = Acid Volatile Sulfides.

Appendix A-2-1.1. Hazard Quotients (HQs) and Hazard Indices (HIs) for contaminants in sediments for the Raymark study area. Benchmark = ER-L reference data.

| Chemical Class | Analyte | ER-L[1] | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21 | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Silver | 1.00 | 2.00 | 3.00 | 3.00 | 2.40 | 1.40 | 1.50 | 1.40 | 1.40 | 0.88 | 0.44 | 0.54 | 0.93 | 0.62 | 1.60 | 0.60 |
| | Arsenic | 8.20 | 2.91 | 1.37 | 2.18 | 1.12 | 0.85 | 1.29 | 0.79 | 1.10 | 1.12 | 0.45 | 0.48 | 1.07 | 1.00 | 0.99 | 0.55 |
| | Barium | | | | | | | | | | | | | | | | |
| | Cadmium | 1.20 | 6.92 | 1.00 | 1.25 | 0.83 | 4.58 | 3.67 | 1.17 | 6.33 | 6.33 | 0.67 | 2.67 | 5.25 | 2.17 | 3.50 | 0.43 |
| | Chromium | 81.0 | 5.72 | 4.96 | 2.85 | 3.58 | 1.11 | 1.23 | 1.04 | 1.13 | 1.43 | 0.39 | 0.46 | 1.13 | 1.20 | 1.32 | 0.73 |
| | Copper | 34.0 | 75.0 | 39.7 | 19.4 | 1071 | 48.5 | 12.6 | 6.82 | 26.2 | 22.8 | 7.97 | 5.53 | 13.6 | 11.3 | 10.6 | 5.09 |
| | Mercury | 0.15 | 2.87 | 5.13 | 8.00 | 3.13 | 1.47 | 2.13 | 2.47 | 1.87 | 3.27 | 1.07 | 1.03 | 1.87 | 1.87 | 1.80 | 1.13 |
| | Nickel | 20.9 | 15.2 | 2.58 | 1.79 | 18.5 | 3.86 | 2.35 | 1.78 | 2.83 | 4.13 | 1.00 | 1.08 | 2.49 | 3.03 | 2.08 | 1.00 |
| | Lead | 46.7 | 70.4 | 16.1 | 3.38 | 567 | 33.6 | 8.63 | 3.88 | 20.0 | 17.8 | 7.64 | 5.32 | 11.0 | 10.8 | 6.49 | 0.91 |
| | Zinc | 150 | 8.93 | 2.66 | 1.95 | 15.5 | 5.00 | 3.39 | 1.93 | 4.47 | 4.51 | 1.21 | 1.82 | 3.50 | 2.42 | 2.93 | 1.14 |
| | Metals Hazard Index[2] | | 190 | 75.5 | 43.8 | 1683 | 100 | 36.8 | 21.3 | 65.3 | 62.3 | 20.8 | 18.9 | 40.8 | 34.4 | 31.3 | 11.6 |
| PAHs | 2-Methylnaphthalene | 70.0 | 14.3 | 9.43 | 9.43 | 9.43 | 10.1 | 9.29 | 9.43 | 14.3 | 24.3 | 8.71 | 8.79 | 14.1 | 9.43 | 14.3 | 8.14 |
| | Acenaphthene | 16.0 | 62.5 | 41.3 | 41.3 | 41.3 | 8.75 | 10.0 | 41.3 | 12.5 | 12.5 | 38.1 | 5.31 | 10.0 | 41.3 | 62.5 | 35.6 |
| | Acenaphthylene | 44.0 | 4.32 | 4.55 | 15.0 | 15.0 | 7.95 | 7.50 | 2.95 | 9.32 | 10.0 | 3.18 | 3.75 | 7.73 | 2.50 | 4.55 | 1.91 |
| | Anthracene | 85.3 | 1.41 | 2.23 | 7.74 | 7.74 | 6.10 | 6.10 | 1.64 | 7.97 | 7.50 | 2.93 | 3.58 | 6.68 | 1.76 | 3.52 | 1.41 |
| | Benzo(a)anthracene | 261 | 5.75 | 2.15 | 0.73 | 2.53 | 9.58 | 10.3 | 2.57 | 15.3 | 14.6 | 3.07 | 5.56 | 11.1 | 3.41 | 6.51 | 1.65 |
| | Benzo(a)pyrene | 430 | 3.95 | 1.53 | 0.53 | 0.28 | 5.58 | 5.12 | 1.49 | 9.30 | 8.37 | 1.84 | 3.26 | 6.74 | 2.23 | 4.42 | 1.09 |
| | Chrysene | 384 | 7.29 | 2.21 | 1.04 | 0.47 | 10.4 | 10.4 | 2.60 | 26.0 | 24.0 | 3.13 | 5.21 | 11.7 | 4.17 | 8.85 | 2.34 |
| | Dibenz(a,h)anthracene | 63.4 | 4.10 | 3.00 | 1.17 | 10.4 | 7.26 | 8.36 | 3.00 | 17.4 | 15.8 | 5.05 | 5.44 | 14.8 | 4.89 | 9.46 | 2.37 |
| | Fluoranthene | 600 | 1.58 | 0.78 | 0.65 | 1.10 | 2.33 | 7.00 | 0.63 | 15.2 | 14.0 | 1.00 | 1.49 | 3.00 | 1.12 | 1.83 | 1.37 |
| | Fluorene | 19.0 | 73.7 | 38.4 | 11.6 | 57.9 | 200 | 205 | 52.1 | 279 | 253 | 57.9 | 103 | 232 | 63.2 | 121 | 28.4 |
| | Naphthalene | 160 | 1.50 | 4.13 | 4.13 | 4.13 | 2.69 | 3.25 | 0.75 | 3.81 | 3.44 | 1.00 | 1.69 | 3.44 | 1.00 | 1.94 | 3.56 |
| | Phenanthrene | 240 | 18.8 | 5.00 | 1.38 | 1.17 | 23.3 | 18.75 | 6.25 | 45.8 | 45.8 | 6.25 | 14.4 | 32.9 | 10.0 | 20.4 | 3.58 |
| | Pyrene | 665 | 1.50 | 0.99 | 0.99 | 0.99 | 0.29 | 0.39 | 0.99 | 0.33 | 0.54 | 0.11 | 0.21 | 0.33 | 0.12 | 0.20 | 0.86 |
| | PAH Hazard Index[2] | | 201 | 116 | 95.6 | 152 | 294 | 302 | 126 | 456 | 433 | 132.3 | 161 | 354 | 145 | 260 | 92.3 |
| PCBs | Total PCBs | 22.7 | 1193 | 265 | 10.9 | 13973 | 913 | 104 | 42.6 | 382 | 205 | 107 | 55.8 | 181 | 214 | 105 | 4.61 |
| | Sum of Aroclors | | | | | | | | | | | | | | | | |
| PST | p,p'-DDE | 2.20 | | | | 1.64 | | 3.27 | | | | | 2.45 | | | | |

Hazard Quotients calculated as sediment concentration/benchmark.

Shaded cells indicate HQs and HIs>1.

See Appendix A-1-1 for sediment concentrations.

1 - All benchmarks from Long *et al.*, 1995.

2 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

Appendix A-2-1.2. Hazard Quotients (HQs) and Hazard Indices (HIs) for contaminants in sediments for the Raymark study area. Benchmark = ER-M reference data.

| Chemical Class | Analyte | ER-M[1] | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21 | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Silver | 3.70 | 0.54 | 0.81 | 0.81 | 0.65 | 0.38 | 0.41 | 0.38 | 0.38 | 0.24 | 0.12 | 0.14 | 0.25 | 0.17 | 0.43 | 0.16 |
| | Arsenic | 70.0 | 0.34 | 0.16 | 0.26 | 0.13 | 0.10 | 0.15 | 0.09 | 0.13 | 0.13 | 0.05 | 0.06 | 0.13 | 0.12 | 0.12 | 0.06 |
| | Barium | | | | | | | | | | | | | | | | |
| | Cadmium | 906 | 9.2E-3 | 1.3E-3 | 1.7E-3 | 1.1E-3 | 6.1E-3 | 4.9E-3 | 1.5E-3 | 8.4E-3 | 8.4E-3 | 8.8E-4 | 3.5E-3 | 7.0E-3 | 2.9E-3 | 4.6E-3 | 5.6E-4 |
| | Chromium | 370 | 1.25 | 1.09 | 0.62 | 0.78 | 0.24 | 0.27 | 0.23 | 0.25 | 0.31 | 0.09 | 0.10 | 0.25 | 0.26 | 0.29 | 0.16 |
| | Copper | 270 | 9.44 | 5.00 | 2.45 | 135 | 6.11 | 1.59 | 0.86 | 3.30 | 2.87 | 1.00 | 0.70 | 1.71 | 1.42 | 1.34 | 0.64 |
| | Mercury | 0.71 | 0.61 | 1.08 | 1.69 | 0.66 | 0.31 | 0.45 | 0.52 | 0.39 | 0.69 | 0.23 | 0.22 | 0.39 | 0.39 | 0.38 | 0.24 |
| | Nickel | 51.6 | 6.14 | 1.05 | 0.72 | 7.48 | 1.56 | 0.95 | 0.72 | 1.15 | 1.67 | 0.40 | 0.44 | 1.01 | 1.23 | 0.84 | 0.41 |
| | Lead | 218 | 15.1 | 3.22 | 0.72 | 122 | 7.20 | 1.85 | 0.83 | 4.28 | 3.82 | 1.84 | 1.14 | 2.36 | 2.32 | 1.39 | 0.19 |
| | Zinc | 410 | 3.27 | 0.97 | 0.71 | 5.66 | 1.83 | 1.24 | 0.71 | 1.64 | 1.65 | 0.44 | 0.67 | 1.28 | 0.89 | 1.07 | 0.42 |
| | Metals Hazard Index[2] | | 36.7 | 13.4 | 7.99 | 272 | 17.7 | 6.92 | 4.34 | 11.5 | 11.4 | 3.97 | 3.46 | 7.39 | 6.80 | 5.86 | 2.29 |
| PAHs | 2-Methylnaphthalene | 670 | 1.49 | 0.99 | 0.99 | 0.99 | 1.06 | 0.97 | 0.99 | 1.49 | 2.54 | 0.91 | 0.92 | 1.48 | 0.99 | 1.49 | 0.85 |
| | Acenaphthene | 500 | 2.00 | 1.32 | 1.32 | 1.32 | 0.28 | 0.32 | 1.32 | 0.40 | 0.40 | 1.22 | 0.17 | 0.32 | 1.32 | 2.00 | 1.14 |
| | Acenaphthylene | 640 | 0.30 | 0.31 | 1.03 | 1.03 | 0.55 | 0.52 | 0.20 | 0.64 | 0.69 | 0.22 | 0.26 | 0.53 | 0.17 | 0.31 | 0.13 |
| | Anthracene | 1100 | 0.11 | 0.17 | 0.60 | 0.60 | 0.47 | 0.47 | 0.13 | 0.62 | 0.58 | 0.23 | 0.28 | 0.52 | 0.14 | 0.27 | 0.11 |
| | Benzo(a)anthracene | 1600 | 0.94 | 0.35 | 0.12 | 0.41 | 1.56 | 1.69 | 0.42 | 2.50 | 2.38 | 0.50 | 0.91 | 1.81 | 0.56 | 1.06 | 0.27 |
| | Benzo(a)pyrene | 1600 | 1.06 | 0.41 | 0.14 | 0.08 | 1.50 | 1.38 | 0.40 | 2.50 | 2.25 | 0.49 | 0.88 | 1.81 | 0.60 | 1.19 | 0.29 |
| | Chrysene | 2800 | 1.00 | 0.30 | 0.14 | 0.06 | 1.43 | 1.43 | 0.36 | 3.57 | 3.29 | 0.43 | 0.71 | 1.61 | 0.57 | 1.21 | 0.32 |
| | Dibenz(a,h)anthracene | 260 | 1.00 | 0.73 | 0.28 | 2.54 | 1.77 | 2.04 | 0.73 | 4.23 | 3.85 | 1.23 | 1.33 | 3.62 | 1.19 | 2.31 | 0.58 |
| | Fluoranthene | 5100 | 0.19 | 0.09 | 0.08 | 0.13 | 0.27 | 0.82 | 0.07 | 1.78 | 1.65 | 0.12 | 0.18 | 0.35 | 0.13 | 0.22 | 0.16 |
| | Fluorene | 540 | 2.59 | 1.35 | 0.41 | 2.04 | 7.04 | 7.22 | 1.83 | 9.81 | 8.89 | 2.04 | 3.61 | 8.15 | 2.22 | 4.26 | 1.00 |
| | Naphthalene | 2100 | 0.11 | 0.31 | 0.31 | 0.31 | 0.20 | 0.25 | 0.06 | 0.29 | 0.26 | 0.08 | 0.13 | 0.26 | 0.08 | 0.15 | 0.27 |
| | Phenanthrene | 1500 | 3.00 | 0.80 | 0.22 | 0.19 | 3.73 | 3.00 | 1.00 | 7.33 | 7.33 | 1.00 | 2.30 | 5.27 | 1.60 | 3.27 | 0.57 |
| | Pyrene | 2600 | 0.38 | 0.25 | 0.25 | 0.25 | 0.07 | 0.10 | 0.25 | 0.08 | 0.14 | 0.03 | 0.05 | 0.08 | 0.03 | 0.05 | 0.22 |
| | PAH Hazard Index[2] | | 14.2 | 7.40 | 5.90 | 9.95 | 19.9 | 20.2 | 7.76 | 35.3 | 34.2 | 8.49 | 11.7 | 25.8 | 9.60 | 17.8 | 5.92 |
| PCBs | Total PCBs | 180 | 150 | 33.4 | 1.37 | 1762 | 115 | 13.1 | 5.37 | 48.1 | 25.8 | 13.5 | 7.04 | 22.9 | 27.0 | 13.2 | 0.58 |
| | Sum of Aroclors | | | | | | | | | | | | | | | | |
| PST | p,p'-DDE | 27.0 | | | | 0.13 | | 0.27 | | | | | 0.20 | | | | |

Hazard Quotients calculated as sediment concentration/benchmark.

Shaded cells indicate HQs and HIs>1.

See Appendix A-1-1 for sediment concentrations.

1 - All benchmarks from Long *et al.*, 1995.

2 - Hazard Index calculated as sum of analyte-specific Hazard Quotients.

Appendix A-2-2.1. Hazard Quotients (HQs) and Hazard Indices (HIs) for contaminants in WHOLE porewaters for the Raymark TIE.

| Chemical Class | Analyte | WQSV[1,2] | Source[3] | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21 | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Silver | 0.92 | a | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Arsenic | 36.0 | a | 0.55 | 1.63 | 0.56 | 0.93 | 0.00 | 2.64 | 2.24 | 2.04 | 0.49 | 0.22 | 0.33 | 0.96 | 0.33 | 0.53 | 0.50 |
| | Barium | 3.80 | d | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Cadmium | 36.0 | c | 0.16 | 0.10 | 0.00 | 0.09 | 0.08 | 0.11 | 0.04 | 0.08 | 0.09 | 0.02 | 0.09 | 0.09 | 0.08 | 0.10 | 0.08 |
| | Chromium | 50.0 | a | 0.03 | 0.05 | 0.03 | 0.02 | 0.06 | 0.02 | 0.00 | 0.06 | 0.06 | 0.04 | 0.01 | 0.06 | 0.05 | 0.00 | 0.00 |
| | Copper | 20.5 | c | 3.17 | 3.46 | 2.68 | 29.2 | 5.46 | 2.63 | 1.56 | 2.24 | 2.34 | 0.00 | 2.46 | 1.71 | 2.00 | 2.88 | 2.63 |
| | Nickel | 2400 | c | 0.10 | 0.01 | 0.01 | 0.05 | 0.01 | 0.01 | 0.02 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| | Lead | 3020 | c | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Zinc | 343 | c | 4.49 | 0.76 | 1.22 | 0.50 | 0.50 | 0.44 | 0.58 | 0.41 | 0.79 | 0.12 | 0.34 | 0.17 | 0.15 | 0.76 | 0.15 |
| | Metals Hazard Index[4] | | | 8.50 | 6.01 | 4.62 | 30.8 | 6.12 | 5.85 | 4.45 | 4.83 | 3.78 | 0.40 | 3.25 | 3.01 | 2.61 | 4.08 | 3.37 |
| PAHs | 2-Methylnaphthalene | 1.22 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Acenaphthene | 1125 | c | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Acenaphthylene | 0.64 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Anthracene | 0.40 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(a)anthracene | 0.05 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Benzo(a)pyrene | 0.027 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Chrysene | 0.13 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Dibenz(a,h)anthracene | 0.013 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Fluoranthene | 66.9 | c | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Fluorene | 0.14 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Naphthalene | 620 | b | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Phenanthrene | 4.60 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pyrene | 1.21 | e | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | PAH Hazard Index[4] | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PCBs | Total PCBs | 40.0 | c | 0.00 | 27.3 | 0.00 | 0.00 | 0.00 | 52.1 | 50.0 | 12.6 | 0.00 | 0.00 | 0.00 | 28.6 | 0.00 | 55.3 | 0.00 |

See Appendix A-1-2 for porewater concentrations

HQ=sediment porewater concentration/WQSV Blank cells indicate HQs not calculated due to non-detect or zero porewater concentrations

1 - See text for description of WQSV derivation process

2 - Benchmark units: µg/L

3 - Water Quality Screening Value (WQSV) sources

a - U.S. EPA Water Quality Criteria - Saltwater Chronic (USEPA, 1986);

b - U.S. EPA Water Quality Criteria - Freshwater Chronic (USEPA, 1986);

c - literature LC50 values for *Ampelisca* (Berry *et al.*, 1996 (Cd, Cu, Pb, Ni, Zn), Ho *et al.*, 1997 (PCBs));

d - literature values for Daphnids (Suter, 1996 (Ba))

e - EqP partitioning of ER-L sediment benchmark into porewater at 1% TOC

4 - Hazard Index = class-specific sum of Hazard Quotients

Appendix A-2-2.2. Hazard Quotients (HQs) and Hazard Indices (HIs) for contaminants in C-18 and EDTA-treated porewaters for the Raymark TIE.

| Chemical Class | Analyte | WQSV[1,2] | Source[3] | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21 | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metals | Arsenic | 36.0 | a | 0.02 | 1.14 | 0 06 | 0 03 | | 1.77 | 1.61 | 0 15 | | 0 06 | 0.04 | 0 28 | | 1.47 | 0 15 |
| | Cadmium | 36 0 | c | 0 26 | 0 24 | 0.18 | 0 14 | 0 09 | 0.15 | 0.16 | 0 10 | 0 13 | 0 03 | 0 12 | 0 13 | 0 10 | 0 26 | 0 16 |
| | Chromium | 50 0 | a | | 7 6E-3 | | | 2.9E-2 | | | | 2.1E-2 | 1 0E-2 | | 1 9E-2 | 7.2E-3 | | 4 2E-3 |
| | Copper | 20.5 | c | 1.12 | 0 93 | 1.37 | 4.10 | 0.73 | 1.46 | 0.93 | 1.02 | 0.88 | | 0.54 | 1.37 | 0.88 | 1.27 | 1.51 |
| | Nickel | 2400 | c | 2.7E-3 | | | | 5 3E-3 | | | | | | | | | | |
| | Lead | 3020 | c | | | | 1 1E-3 | | | | | 1 5E-3 | | 8 2E-4 | 1 4E-3 | | | |
| | Zinc | 343 | c | 7.00 | 0.29 | 1.49 | 0.67 | 0.50 | 0.20 | 0.26 | 0 35 | 0.41 | 0.20 | 0.22 | 0.12 | 0 15 | 0 20 | 0 17 |
| | Metals Hazard Index[4] | | | 8.40 | 2.60 | 3.09 | 4 95 | 1.36 | 3.58 | 2.96 | 1 63 | 1.43 | 0.30 | 0 91 | 1.92 | 1.13 | 3.20 | 2.01 |
| PCBs | Total PCBs | 40.0 | c | | | | | | | 0.65 | 7.48 | | | | 6.31 | | | |

See Appendix A-1-2 for porewater concentrations

HQ=sediment porewater concentration/WQSV. Blank cells indicate HQs not calculated due to non-detect or zero porewater concentrations.

1 - See text for description of WQSV derivation process.

2 - Benchmark units: µg/L

3 - Water Quality Screening Value (WQSV) sources.

a - U S EPA Water Quality Criteria - Saltwater Chronic (USEPA, 1986);

b - U S EPA Water Quality Criteria - Freshwater Chronic (USEPA, 1986),

c - literature LC50 values for *Ampelisca* (Berry *et al.*, 1996 (Cd, Cu, Pb, Ni, Zn); Ho *et al.*, 1997 (PCBs));

d - literature values for Daphnids (Suter, 1996 (Ba))

e - EqP partitioning of ER-L sediment benchmark into porewater at 1% TOC

4 - Hazard Index = class-specific sum of Hazard Quotients.

Appendix A-2-2.3. Hazard Quotients (HQs) and Hazard Indices (HIs) for contaminants in *Ulva*- and non-*Ulva*-treated porewaters collected from the Raymark study area.

| | | | | *Ulva* | | | | Non-*Ulva* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chemical Class | Analyte | WQSV[1,2] | Source[3] | A3SD10 | HB3A | SD01 | SD28 | A3SD10 | HB3A | SD01 | SD28 |
| Metals | Arsenic | 36.0 | a | 0.52 | 0.56 | 0.02 | 0.22 | 0.66 | 0.71 | 0.07 | 0.41 |
| | Cadmium | 36.0 | c | 0.13 | 0.06 | 0.07 | 0.08 | 0.14 | 0.08 | 0.09 | 0.07 |
| | Chromium | 50.0 | a | | | | | | | | |
| | Copper | 20.5 | c | 3.41 | 18.1 | 1.95 | 3.12 | 2.00 | 30.6 | 1.37 | 2.59 |
| | Nickel | 2400 | c | | | | | | | | |
| | Lead | 3020 | c | | | | | | | | |
| | Zinc | 343 | c | 0.35 | 1.55 | 0.20 | 0.15 | 0.23 | 2.65 | 0.23 | 0.29 |
| PCBs | Total PCBs | 40.0 | c | | | 0.52 | | | | 0.16 | |

See Appendix A-1-2 for porewater concentrations.

HQ=sediment porewater concentration/WQSV. Blank cells indicate HQs not calculated due to non-detect or zero porewater concentrations.

1 - See text for description of WQSV derivation process.

2 - Benchmark units: µg/L.

3 - Water Quality Screening Value (WQSV) sources:

a - U.S. EPA Water Quality Criteria - Saltwater Chronic (USEPA, 1986);

b - U.S. EPA Water Quality Criteria - Freshwater Chronic (USEPA, 1986);

c - literature LC50 values for *Ampelisca* (Berry *et al*., 1996 (Cd, Cu, Pb, Ni, Zn); Ho *et al*., 1997 (PCBs));

d - literature values for Daphnids (Suter, 1996 (Ba)).

e - EqP partitioning of ER-L sediment benchmark into porewater at 1% TOC

4 - Hazard Index = class-specific sum of Hazard Quotients.

Appendix A-2-3. Hazard Quotients (HQs) for *Ampelisca* and *Mulinia* exposed to ammonia in sediment porewaters from the Raymark study area.

| Treat | Class | Analyte | Benchmark[1,2] | A3SD10 | CSD1 | GM08 | HB3A | SD01 | SD07 | SD08 | SD13 | SD14 | SD18 | SD21 | SD23 | SD24 | SD28 | SD37 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PW | AMPAM | Total Ammonia | 30.0 | 0.65 | 0.55 | 0.41 | 0.53 | 1.14 | 1.05 | 0.98 | 1.23 | 0.91 | 1.47 | 1.19 | 0.78 | 0.78 | 0.77 | 1.65 |
| | | Un-ionized Ammonia | 0.40 | 0.30 | 0.84 | 0.16 | 0.32 | 0.75 | 1.60 | 0.89 | 1.03 | 0.68 | 0.23 | 0.70 | 1.29 | 0.94 | 1.27 | 2.01 |
| | MULAM | Total Ammonia | 13.4 | 1.46 | 1.23 | 0.92 | 1.19 | 2.56 | 2.34 | 2.19 | 2.76 | 2.05 | 3.29 | 2.65 | 1.75 | 1.74 | 1.72 | 3.70 |
| | | Un-ionized Ammonia | 0.09 | 1.31 | 3.72 | 0.70 | 1.41 | 3.34 | 7.12 | 3.96 | 4.59 | 3.04 | 1.02 | 3.09 | 5.71 | 4.17 | 5.64 | 8.94 |
| ULVA | AMPAM | Total Ammonia | 30.0 | 0.05 | 0.02 | 0.00 | 0.05 | 0.04 | 0.06 | 0.02 | 0.02 | 0.05 | 0.14 | 0.03 | 0.09 | 0.03 | 0.03 | 0.10 |
| | | Un-ionized Ammonia | 0.40 | 0.04 | 0.08 | 0.01 | 0.07 | 0.08 | 0.23 | 0.07 | 0.06 | 0.11 | 0.23 | 0.09 | 0.10 | 0.08 | 0.09 | 0.27 |
| | MULAM | Total Ammonia | 13.4 | 0.10 | 0.04 | 0.01 | 0.12 | 0.08 | 0.14 | 0.04 | 0.05 | 0.11 | 0.31 | 0.07 | 0.21 | 0.06 | 0.06 | 0.22 |
| | | Un-ionized Ammonia | 0.09 | 0.16 | 0.35 | 0.05 | 0.29 | 0.35 | 1.03 | 0.32 | 0.26 | 0.49 | 1.03 | 0.41 | 0.46 | 0.34 | 0.40 | 1.20 |

AMPAM=*Ampelisca*; MULAM=*Mulinia*

Benchmark units: mg/L

1 - Benchmark for *Ampelisca* NOEC = No Observable Effect Concentration

2 - Benchmark for *Mulinia* larval Development LOEC (Carr, et al., 1996)

3 - Hazard Index = sum of class specific Hazard Quotients

Appendix Table B-1.1. *Ampelisca* survival in whole porewater from the Raymark study area.

| | | Concentration Porewater (%) | | | | | | LC50[2] | LC20[3] |
|---|---|---|---|---|---|---|---|---|---|
| Station | Method[4] | 0[1] | 6.25 | 12.5 | 25 | 50 | 100 | (%) | (%) |
| A3SD10 | a | 100 | 100 | 100 | 100 | 86.7 | 73.3 | >100 | 77.3 |
| CSD1 | a | 100 | 100 | 100 | 93.3 | 100 | 53.3 | >100 | 64.3 |
| GM08 | c | 100 | 100 | 100 | 100 | 100 | 66.7 | >100 | 80.0 |
| HB3A | c | 100 | 86.7 | 100 | 93.3 | 100 | 40.0 | 91.7 | 66.7 |
| SD01 | b | 100 | 100 | 100 | 100 | 66.7 | 0.00 | 56.1 | 40.0 |
| SD07 | b | 100 | 100 | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD08 | a | 100 | 100 | 86.7 | 93.3 | 86.7 | 0.00 | 59.2 | 43.5 |
| SD13 | b | 100 | 100 | 93.3 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD14 | b | 100 | 100 | 93.3 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD18 | b | 100 | 100 | 100 | 80.0 | 0.00 | 0.00 | 31.0 | 25.0 |
| SD21 | c | 100 | 100 | 100 | 100 | 100 | 6.67 | 76.8 | 60.7 |
| SD23 | b | 91.7 | 100 | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD24 | b | 93.3 | 93.3 | 100 | 100 | 80.0 | 0.00 | 62.7 | 51.7 |
| SD28 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| SD37 | b | 91.7 | 100 | 93.3 | 80.0 | 100 | 0.00 | 41.4 | 28.1 |

Shading indicates values excluded from calculations.

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Lethal Concentration - 50% (concentration of porewater causing 50% reduction in survival).

3 - Lethal Concentration - 20% (concentration of porewater causing 20% reduction in survival).

4 - Calculation method:

a - LC50 and LC20 calculated using Maximum Likelihood-Probit method.

b - LC50 calculated using Trimmed Spearman-Karber method; LC20 calculated using Linear Interpolation (IC20).

c - LC50 and LC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-1.2. *Mulinia* normal larval development in whole porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) | | | | | | EC50[2] | EC20[3] |
|---|---|---|---|---|---|---|---|---|---|
| | | 0[1] | 6.25 | 12.5 | 25 | 50 | 100 | (%) | (%) |
| A3SD10 | a | 97.7 | 2.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.91 | 0.41 |
| CSD1 | a | 97.7 | 90.0 | 49.0 | 12.3 | 0.00 | 0.00 | 17.3 | 11.7 |
| GM08 | a | 96.0 | 96.3 | 89.0 | 12.7 | 0.00 | 0.00 | 18.5 | 14.8 |
| HB3A | a | 95.7 | 93.0 | 20.7 | 0.00 | 0.00 | 0.00 | 10.2 | 8.26 |
| SD01 | a | 95.3 | 92.0 | 49.7 | | 0.00 | 0.00 | 12.7 | 9.21 |
| SD07 | a | 96.3 | 85.0 | 24.7 | 0.00 | 0.00 | 0.00 | 9.73 | 7.20 |
| SD08 | a | 97.0 | 41.3 | 10.7 | 92.0 | 0.00 | 0.00 | 5.55 | 3.20 |
| SD13 | a | 97.0 | 91.7 | 84.3 | 67.0 | 21.3 | 0.00 | 32.4 | 20.7 |
| SD14 | a | 96.7 | 88.3 | 82.7 | | 0.00 | 0.00 | 17.1 | 13.8 |
| SD18 | c | 93.0 | 0.00 | 0.00 | | 0.00 | 0.00 | 3.13 | 1.25 |
| SD21 | a | 98.0 | 78.3 | 56.7 | 0.00 | 0.00 | 0.00 | 11.4 | 7.58 |
| SD23 | c | 94.7 | 89.0 | 83.3 | 78.7 | 67.0 | 0.00 | 64.7 | 31.3 |
| SD24 | a | 98.3 | 92.0 | 89.0 | 28.3 | 3.67 | 0.00 | 21.2 | 14.9 |
| SD28 | c | 96.0 | 94.7 | 96.3 | 91.0 | 86.7 | 0.00 | 72.3 | 55.7 |
| SD37 | a | 95.3 | 88.7 | 12.0 | 0.00 | 0.00 | 0.00 | 9.23 | 7.39 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Effect Concentration - 50% (concentration of porewater causing 50% reduction in test response).

3 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

4 - Calculation method:

a - EC50 and EC20 calculated using Maximum Likelihood-Probit method.

b - EC50 calculated using Trimmed Spearman-Karber method; EC20 calculated using Linear Interpolation (IC20).

c - EC50 and EC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-2.1. *Ampelisca* survival in C-18 treated porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) 0[1] | 10 | 50 | 100 | LC50[2] (%) | LC20[3] (%) |
|---|---|---|---|---|---|---|---|
| A3SD10 | c | 100 | 100 | 100 | 90.0 | >100 | 100.0 |
| CSD1 | c | 100 | 100 | 100 | 70.0 | >100 | 83.3 |
| GM08 | c | 100 | 100 | 100 | 100 | >100 | 100.0 |
| HB3A | a | 100 | 100 | 30.0 | 40.0 | 52.2 | 22.7 |
| SD01 | b | 100 | 100 | 90.0 | 0.00 | 63.0 | 55.6 |
| SD07 | c | 100 | 100 | 100 | 70.0 | >100 | 83.3 |
| SD08 | c | 80.0 | 100 | 100 | 0.00 | 75.0 | 60.0 |
| SD13 | b | 90.0 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD14 | b | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD18 | b | 100 | 100 | 0.00 | 0.00 | 22.4 | 18.0 |
| SD21 | c | 100 | 100 | 100 | 0.00 | 75.0 | 60.0 |
| SD23 | b | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD24 | b | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD28 | c | 100 | 100 | 100 | 100 | >100 | 100 |
| SD37 | c | 100 | 90.0 | 90.0 | 0.00 | 68.0 | 55.0 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Lethal Concentration - 50% (concentration of porewater causing 50% reduction in survival).

3 - Lethal Concentration - 20% (concentration of porewater causing 20% reduction in survival).

4 - Calculation method:

a - LC50 and LC20 calculated using Maximum Likelihood-Probit method.

b - LC50 calculated using Trimmed Spearman-Karber method; LC20 calculated using Linear Interpolation (IC20).

c - LC50 and LC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-2.2. *Mulinia* normal larval development in C-18 treated porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) 0[1] | 10 | 50 | 100 | EC50[2] (%) | EC20[3] (%) |
|---|---|---|---|---|---|---|---|
| A3SD10 | c | 96.0 | 2.33 | 0.00 | 0.00 | 5.12 | 2.05 |
| CSD1 | c | 93.3 | 17.3 | 0.00 | 0.00 | 6.14 | 2.46 |
| GM08 | a | 95.3 | 89.7 | 33.0 | 47.0 | 57.7 | 15.9 |
| HB3A | c | 88.0 | 90.7 | 0.00 | 0.00 | 30.0 | 18.0 |
| SD01 | c | 95.3 | 96.0 | 0.00 | 0.00 | 30.0 | 18.0 |
| SD07 | c | 97.7 | 23.3 | 0.00 | 0.00 | 6.57 | 2.63 |
| SD08 | c | 96.3 | 34.0 | 0.00 | 0.00 | 7.73 | 3.09 |
| SD13 | c | 96.3 | 92.7 | 0.00 | 0.00 | 29.2 | 16.7 |
| SD14 | c | 94.0 | 92.3 | 0.00 | 0.00 | 29.6 | 17.4 |
| SD18 | c | 89.7 | 94.0 | 22.3 | 0.00 | 36.4 | 20.6 |
| SD21 | c | 92.7 | 89.7 | 0.00 | 0.00 | 29.3 | 16.9 |
| SD23 | a | 94.7 | 93.0 | 73.3 | 64.3 | >100 | 49.2 |
| SD24 | a | 97.7 | 94.0 | 58.0 | 0.00 | 52.1 | 45.7 |
| SD28 | a | 97.7 | 93.7 | 69.7 | 3.33 | 59.5 | 46.8 |
| SD37 | c | 97.3 | 82.7 | 0.00 | 0.00 | 12.8 | 10.5 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Effect Concentration - 50% (concentration of porewater causing 50% reduction in test response).

3 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

4 - Calculation method:

a - EC50 and EC20 calculated using Maximum Likelihood-Probit method.

b - EC50 calculated using Trimmed Spearman-Karber method; EC20 calculated using Linear Interpolation (IC20).

c - EC50 and EC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-3.1. *Ampelisca* survival in EDTA-treated porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) | | | | LC50[2] | LC20[3] |
|---|---|---|---|---|---|---|---|
| | | 0[1] | 10 | 50 | 100 | (%) | (%) |
| A3SD10 | c | 100 | 100 | 100 | 100 | >100 | 100 |
| CSD1 | c | 100 | 100 | 100 | 50.0 | >100 | 70.0 |
| GM08 | a | 100 | 100 | 90.0 | 80.0 | >100 | 100 |
| HB3A | c | 90.0 | 100 | 100 | 0.00 | 75.0 | 60.0 |
| SD01 | b | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD07 | b | 100 | 100 | 100 | 20.0 | 77.1 | 62.5 |
| SD08 | c | 100 | 100 | 100 | 0.00 | 75.0 | 60.0 |
| SD13 | b | 100 | 100 | 100 | 0.00 | 70.7 | 60.0 |
| SD14 | b | 100 | 100 | 90.0 | 0.00 | 63.0 | 55.6 |
| SD18 | b | 100 | 100 | 0.00 | 0.00 | 22.4 | 18.0 |
| SD21 | c | 100 | 100 | 100 | 0.00 | 75.0 | 60.0 |
| SD23 | b | 87.5 | 90.0 | 100 | 0.00 | 70.7 | 60.0 |
| SD24 | b | 100 | 100 | 100 | 10.0 | 73.5 | 61.1 |
| SD28 | c | 100 | 100 | 100 | 90.0 | >100 | 100 |
| SD37 | b | 100 | 90.0 | 100 | 0.00 | 69.4 | 57.9 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Lethal Concentration - 50% (concentration of porewater causing 50% reduction in survival).

3 - Lethal Concentration - 20% (concentration of porewater causing 20% reduction in survival).

4 - Calculation method:

a - LC50 and LC20 calculated using Maximum Likelihood-Probit method.

b - LC50 calculated using Trimmed Spearman-Karber method; LC20 calculated using Linear Interpolation (IC20).

c - LC50 and LC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-3.2. *Mulinia* normal larval development in EDTA-treated porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) | | | | EC50[2] (%) | EC20[3] (%) |
|---|---|---|---|---|---|---|---|
| | | 0[1] | 10 | 50 | 100 | | |
| A3SD10 | c | 98.3 | 95.3 | 0.00 | 0.00 | 29.4 | 17.0 |
| CSD1 | c | 95.3 | 78.7 | 0.33 | 0.00 | 25.8 | 11.2 |
| GM08 | c | 94.7 | 97.7 | 87.7 | 20.7 | 79.5 | 58.0 |
| HB3A | c | 95.7 | 92.7 | 0.00 | 0.00 | 29.4 | 16.9 |
| SD01 | c | 97.7 | 91.7 | 0.00 | 0.00 | 28.7 | 15.9 |
| SD07 | c | 94.7 | 92.3 | 0.00 | 0.00 | 29.5 | 17.2 |
| SD08 | c | 95.7 | 25.0 | 0.00 | 0.00 | 6.77 | 2.71 |
| SD13 | c | 93.7 | 93.0 | 0.00 | 0.00 | 29.9 | 17.8 |
| SD14 | c | 99.0 | 93.0 | 0.00 | 0.00 | 28.7 | 15.9 |
| SD18 | c | 99.0 | 0.00 | 0.00 | 0.00 | 5.00 | 2.00 |
| SD21 | c | 95.7 | 88.0 | 0.00 | 0.00 | 28.3 | 15.2 |
| SD23 | c | 94.0 | 79.3 | 0.00 | 0.00 | 26.3 | 12.1 |
| SD24 | b | 96.3 | 96.3 | 26.7 | 0.00 | 30.8 | 21.1 |
| SD28 | a | 96.3 | 93.3 | 85.3 | 5.67 | 68.4 | 55.7 |
| SD37 | c | 93.7 | 76.3 | 0.00 | 0.00 | 25.5 | 10.7 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Effect Concentration - 50% (concentration of porewater causing 50% reduction in test response).

3 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

4 - Calculation method:

a - EC50 and EC20 calculated using Maximum Likelihood-Probit method.

b - EC50 calculated using Trimmed Spearman-Karber method; EC20 calculated using Linear Interpolation (IC20).

c - EC50 and EC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-4.1. *Ampelisca* survival in *Ulva*-treated porewater from the Raymark study area.

| Station | Method[4] | Concentration Porewater (%) | | | | | | LC50[2] (%) | LC20[3] (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | 0[1] | 6.25 | 12.5 | 25 | 50 | 100 | | |
| A3SD10 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| CSD1 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| GM08 | c | 100 | 100 | 100 | 100 | 93.3 | 100 | >100 | 100 |
| HB3A | a | 100 | 93.3 | 93.3 | 100 | 53.3 | 0.00 | 45.5 | 24.0 |
| SD01 | a | 100 | 100 | 100 | 100 | 93.3 | 60.0 | >100 | 72.8 |
| SD07 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| SD08 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| SD13 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| SD14 | a | 100 | 100 | 100 | 93.3 | 66.7 | 53.3 | 93.8 | 43.6 |
| SD18 | a | 100 | 100 | 80.0 | 77.5 | 65.0 | 0.00 | 40.8 | 20.0 |
| SD21 | a | 100 | 100 | 100 | 100 | 66.7 | 45.0 | 80.8 | 46.9 |
| SD23 | c | 100 | 100 | 100 | 100 | 100 | 93.3 | >100 | 100 |
| SD24 | c | 100 | 100 | 100 | 100 | 100 | 93.3 | >100 | 100 |
| SD28 | c | 100 | 100 | 100 | 100 | 100 | 100 | >100 | 100 |
| SD37 | c | 100 | 100 | 100 | 100 | 100 | 93.3 | >100 | 100 |

1 - Control value for experiment, assumed for all treatments, is 0% porewater.

2 - Lethal Concentration - 50% (concentration of porewater causing 50% reduction in survival).

3 - Lethal Concentration - 20% (concentration of porewater causing 20% reduction in survival).

4 - Calculation method:

a - LC50 and LC20 calculated using Maximum Likelihood-Probit method.

b - LC50 calculated using Trimmed Spearman-Karber method; LC20 calculated using Linear Interpolation (IC20).

c - LC50 and LC20 calculated using Linear Interpolation (IC50 and IC20).

Appendix Table B-4.2. *Mulinia* normal larval development in *Ulva*-treated porewater from the Raymark study are

| Station | Method[4] | Concentration Porewater (%) 0[1] | 6.25 | 12.5 | 25 | 50 | 100 | EC50[2] (%) | EC20[3] (%) |
|---|---|---|---|---|---|---|---|---|---|
| A3SD10 | c | 95.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.13 | 1.25 |
| CSD1 | c | 95.7 | 5.00 | 6.00 | 0.00 | 0.00 | 0.00 | 6.67 | 2.67 |
| GM08 | c | 95.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.13 | 1.25 |
| HB3A | c | 95.7 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 3.14 | 1.25 |
| SD01 | a | 95.7 | 0.33 | 16.7 | 12.7 | 0.00 | 0.00 | 5.28 | 2.14 |
| SD07 | a | 95.7 | 0.00 | 10.3 | 4.33 | 0.00 | 0.00 | 3.80 | 1.64 |
| SD08 | a | 95.7 | 7.50 | 62.0 | 47.5 | 1.00 | 0.00 | 19.0 | 11.1 |
| SD13 | a | 95.7 | | 66.0 | 46.5 | 17.5 | 0.00 | 21.4 | 10.8 |
| SD14 | a | 95.7 | | 64.0 | 41.0 | 3.50 | 1.00 | 18.6 | 10.3 |
| SD18 | a | 95.7 | | 44.0 | | 21.0 | 0.00 | 12.0 | 5.91 |
| SD21 | c | 95.7 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 3.14 | 1.25 |
| SD23 | a | 95.7 | 6.33 | 4.00 | 0.00 | 0.00 | 0.00 | 1.08 | 0.38 |
| SD24 | c | 95.7 | 0.00 | 9.67 | 0.00 | 0.00 | 0.00 | 6.95 | 2.78 |
| SD28 | a | 95.7 | | 67.0 | 61.0 | 0.00 | 0.00 | 22.3 | 13.8 |
| SD37 | a | 95.7 | 35.0 | 27.7 | 4.00 | 0.33 | 0.00 | 5.23 | 2.24 |

Shading indicates values excluded from calculations.

1 - Control value for experiment, assumed for all treatments, is 0% porewater. No control data available for *Ulva* treatment; control value taken as average of controls from whole, EDTA, and C18 treatments.

2 - Effect Concentration - 50% (concentration of porewater causing 50% reduction in test response).

3 - Effect Concentration - 20% (concentration of porewater causing 20% reduction in test response).

4 - Calculation method:

a - EC50 and EC20 calculated using Maximum Likelihood-Probit method.

b - EC50 calculated using Trimmed Spearman-Karber method; EC20 calculated using Linear Interpolation (IC20).

c - EC50 and EC20 calculated using Linear Interpolation (IC50 and IC20).